EXHIBIT A

US007525955B2

(12) **United States Patent**
Velez-Rivera et al.

(10) **Patent No.: US 7,525,955 B2**
(45) **Date of Patent: Apr. 28, 2009**

(54) **INTERNET PROTOCOL (IP) PHONE WITH SEARCH AND ADVERTISING CAPABILITY**

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(73) Assignee: **Commuca, Inc.**, Erie, CO (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 511 days.

(21) Appl. No.: **11/082,361**

(22) Filed: **Mar. 17, 2005**

(65) **Prior Publication Data**

US 2005/0207432 A1 Sep. 22, 2005

Related U.S. Application Data

(60) Provisional application No. 60/554,548, filed on Mar. 19, 2004, provisional application No. 60/554,544, filed on Mar. 19, 2004.

(51) **Int. Cl.**
H04L 12/66 (2006.01)

(52) **U.S. Cl.** **370/352**; 709/219; 379/114.13

(58) **Field of Classification Search** 370/352; 709/219; 379/114.13
See application file for complete search history.

(56) **References Cited**

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Primary Examiner—Quynh H Nguyen
(74) *Attorney, Agent, or Firm*—Ruben C. DeLeon

(57) **ABSTRACT**

A software platform in an Internet Protocol (IP) phone having the ability to be used with different communication infrastructures such as broadband, wireless communication and Plain Old Telephone System (POTS) service. Further, the software platform in the IP phone has the ability to be used with different applications operating on the IP phone. Further, the IP phone has the ability to perform additional functionality than traditional Public Switched Telephone Network (PSTN) phones, such as searches and advertising, given its ability to converge voice and data within a single terminal.

24 Claims, 27 Drawing Sheets

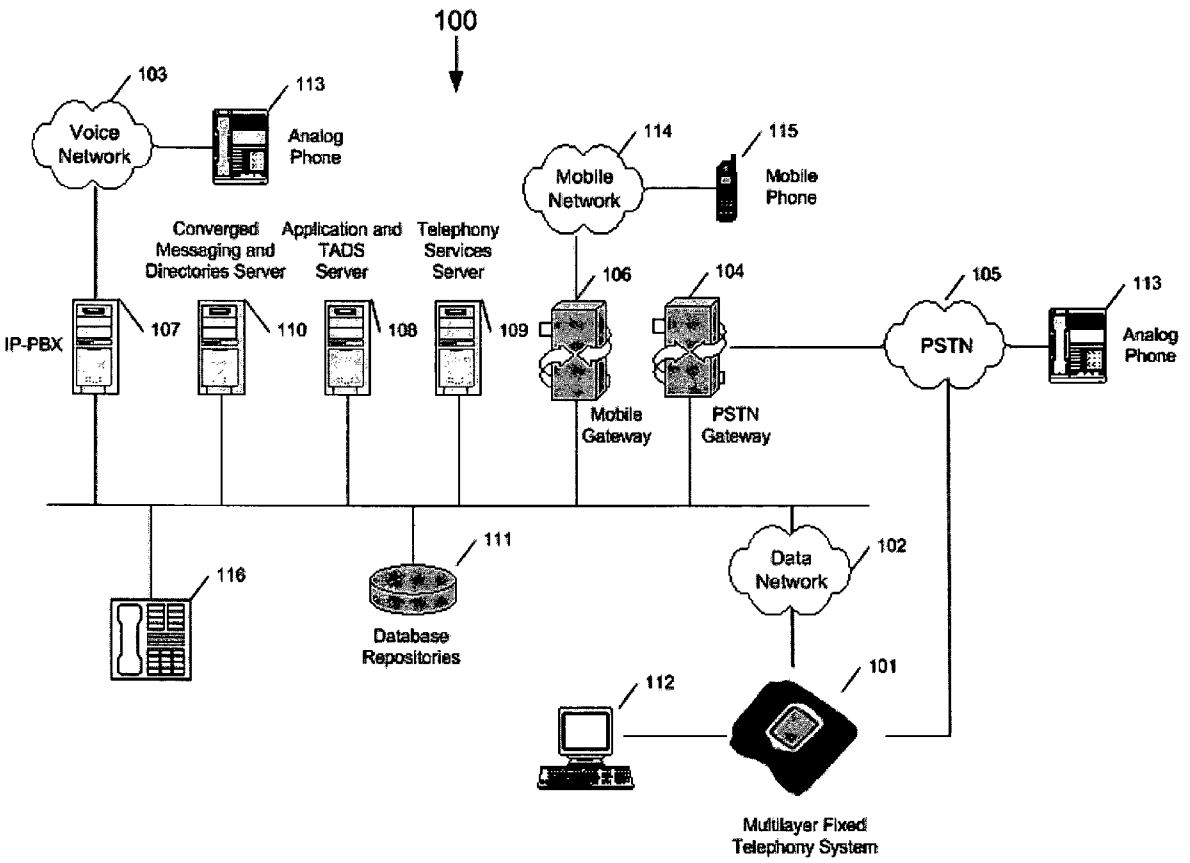
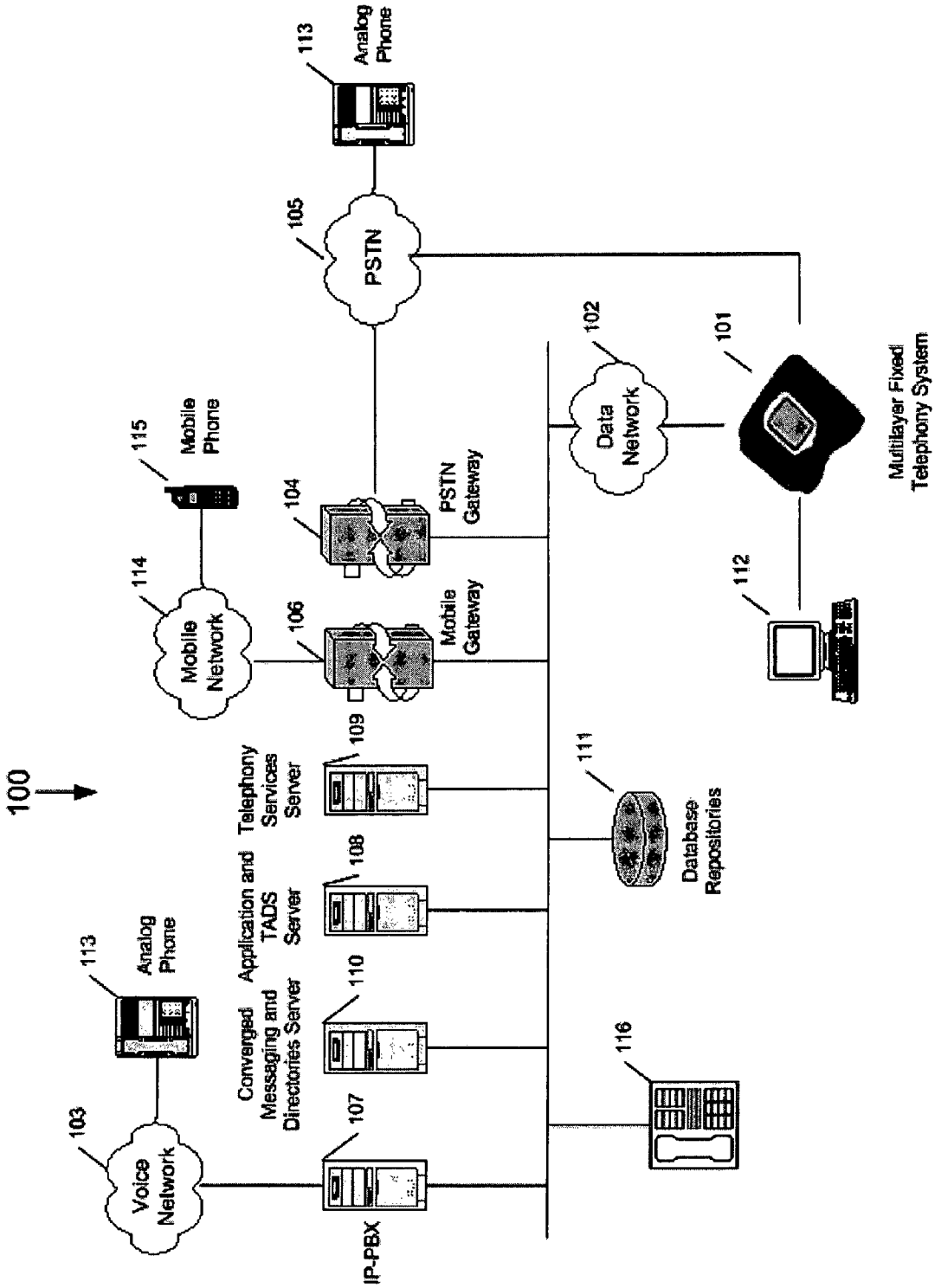


Figure 1


100
Analog Phone
113
PSTN
105
Mobile Phone
115
Mobile Network
114
PSTN Gateway
104
Mobile Gateway
106
Data Network
102
Multilayer Fixed Telephony System
101
112
Telephony Services Server
109
Application and TADS Server
108
Converged Messaging and Directories Server
110
IP-PBX
107
Voice Network
103
Analog Phone
113
Database Repositories
111
116

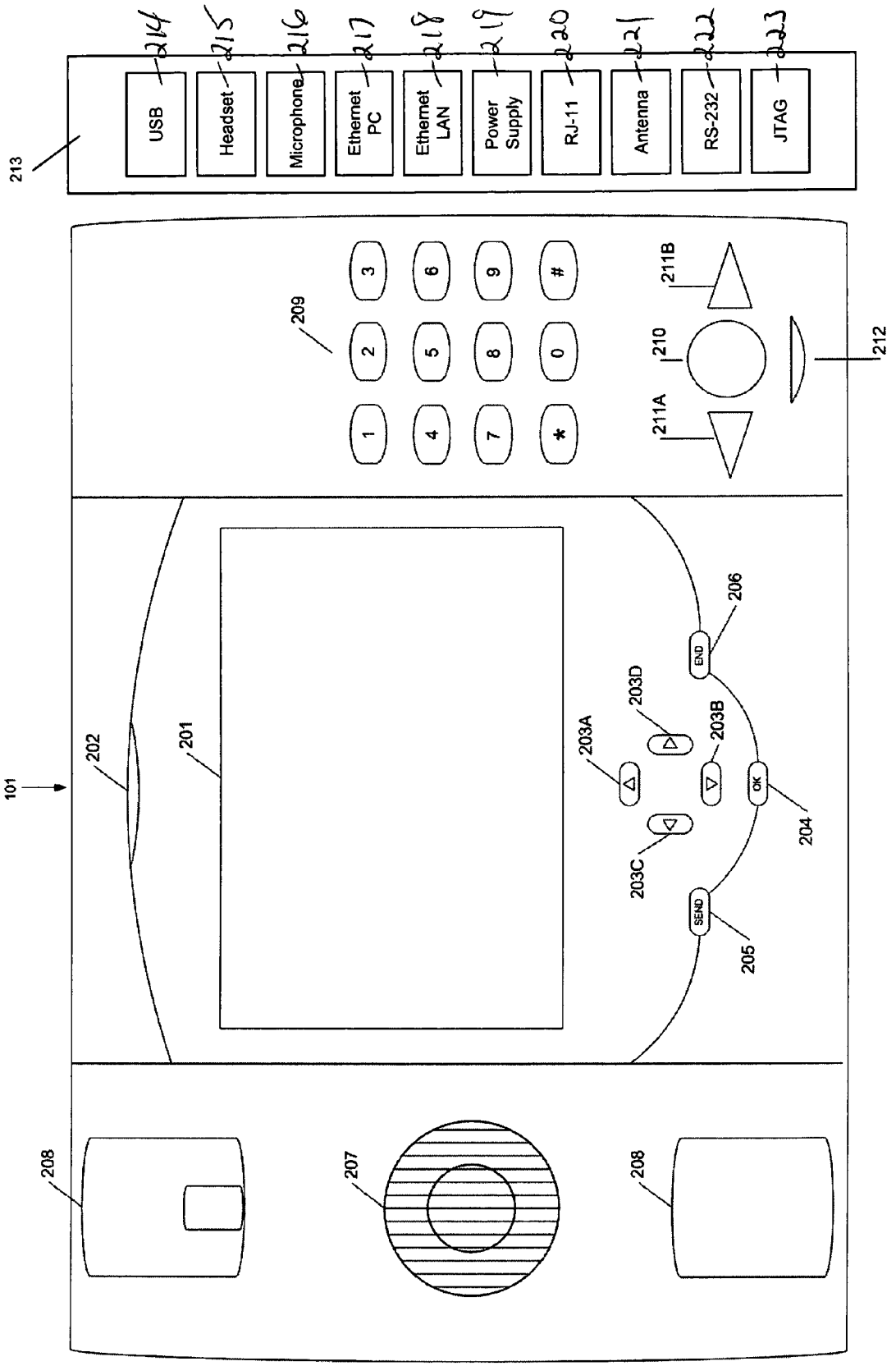

213
214
USB
215
Headset
216
Microphone
217
Ethernet PC
218
Ethernet LAN
219
Power Supply
220
RJ-11
221
Antenna
222
RS-232
223
JTAG
209
1
2
3
4
5
6
7
8
9
*
0
#
211A
210
211B
212
101
202
201
206
END
203D
203A
203B
OK
203C
204
SEND
205
208
207
208

Figure 2

Figure 3

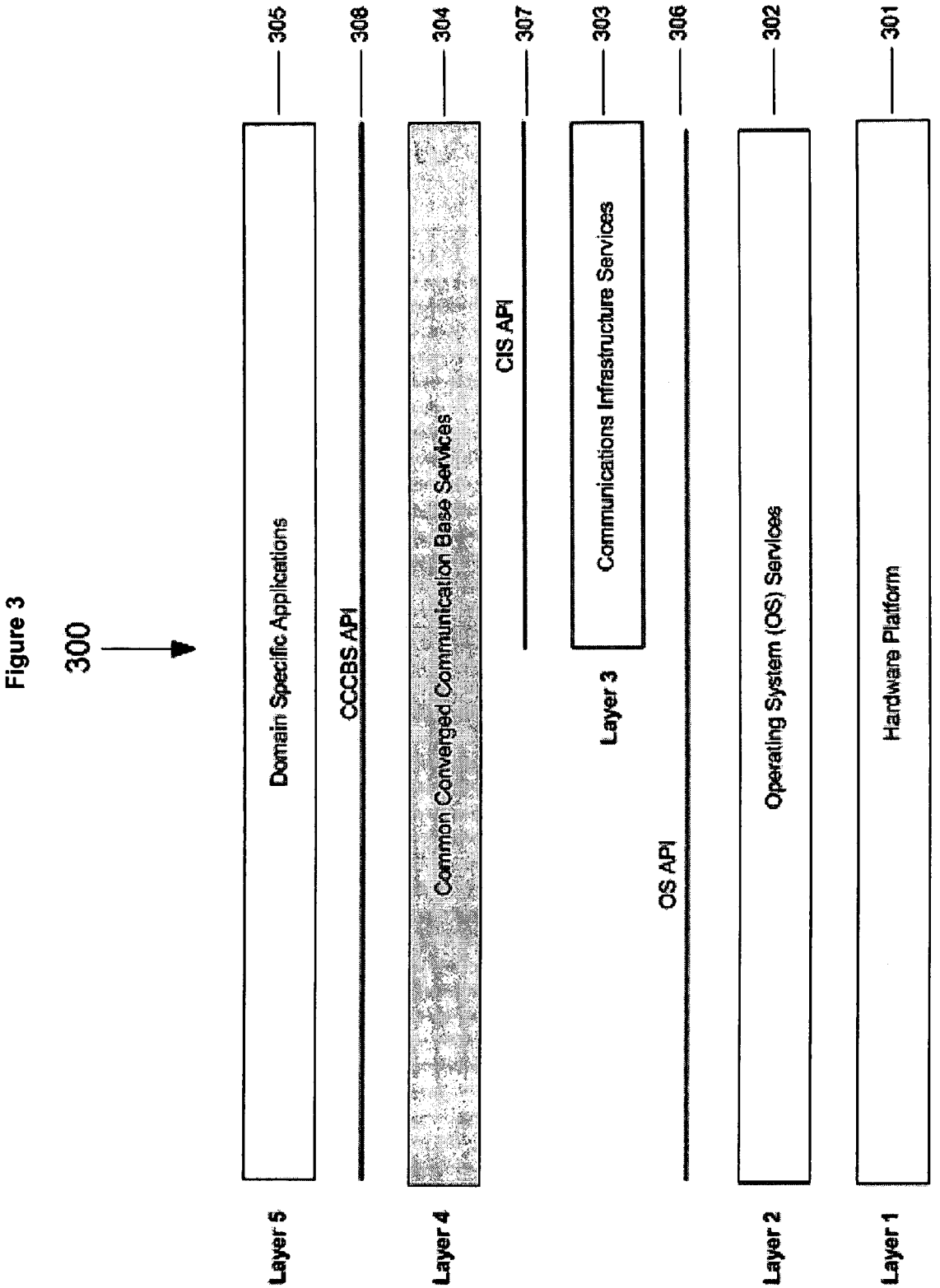

300
305
308
304
307
303
306
302
301
Domain Specific Applications
CCCBS API
Common Converged Communication Base Services
CIS API
Communications Infrastructure Services
Layer 3
OS API
Operating System (OS) Services
Hardware Platform
Layer 5
Layer 4
Layer 2
Layer 1

Figure 4

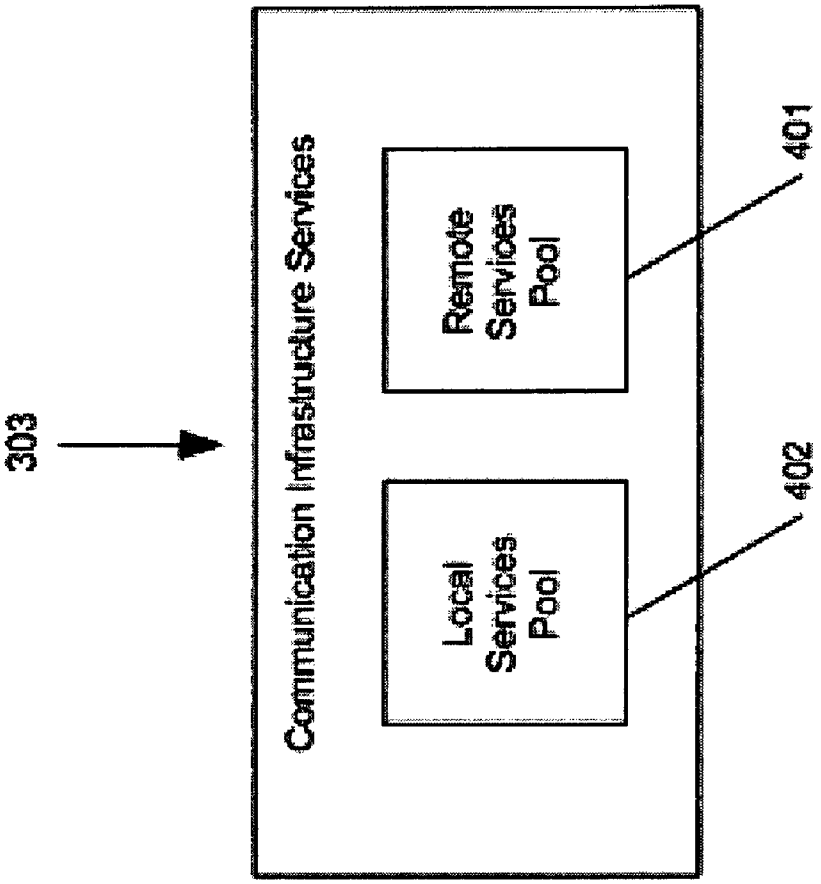

303
Communication Infrastructure Services
Remote Services Pool
Local Services Pool
401
402

Figure 5

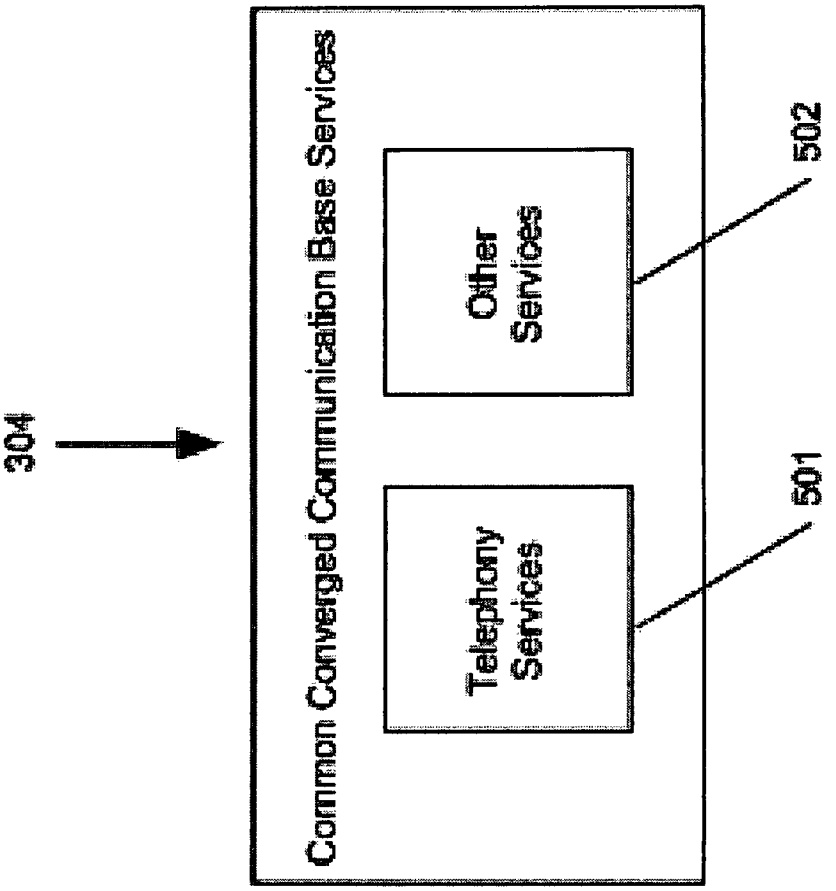

304
Common Converged Communication Base Services
Other Services
Telephony Services
502
501

Figure 6

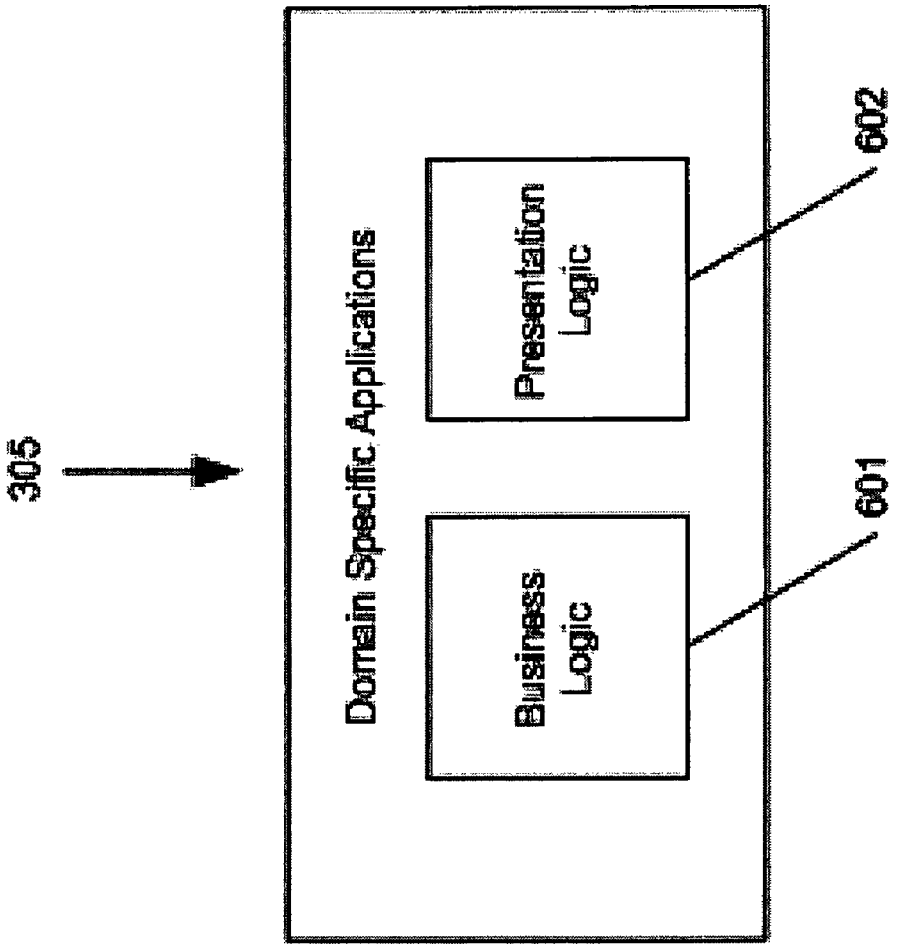

305
Domain Specific Applications
Presentation Logic
602
Business Logic
601

Figure 7

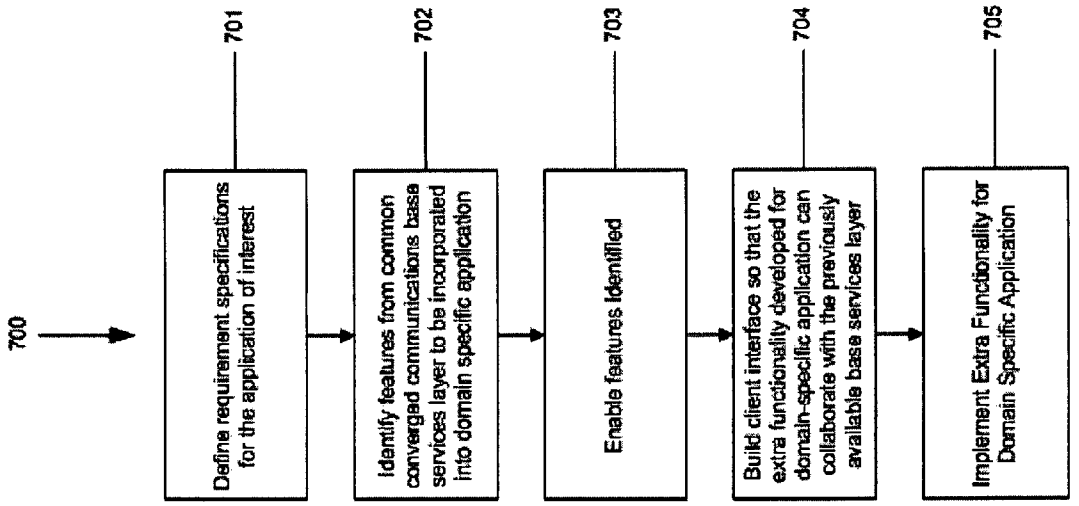

700
701
Define requirement specifications for the application of interest
702
Identify features from common converged communications base services layer to be incorporated into domain specific application
703
Enable features identified
704
Build client interface so that the extra functionality developed for domain-specific application can collaborate with the previously available base services layer
705
Implement Extra Functionality for Domain Specific Application

Figure 8

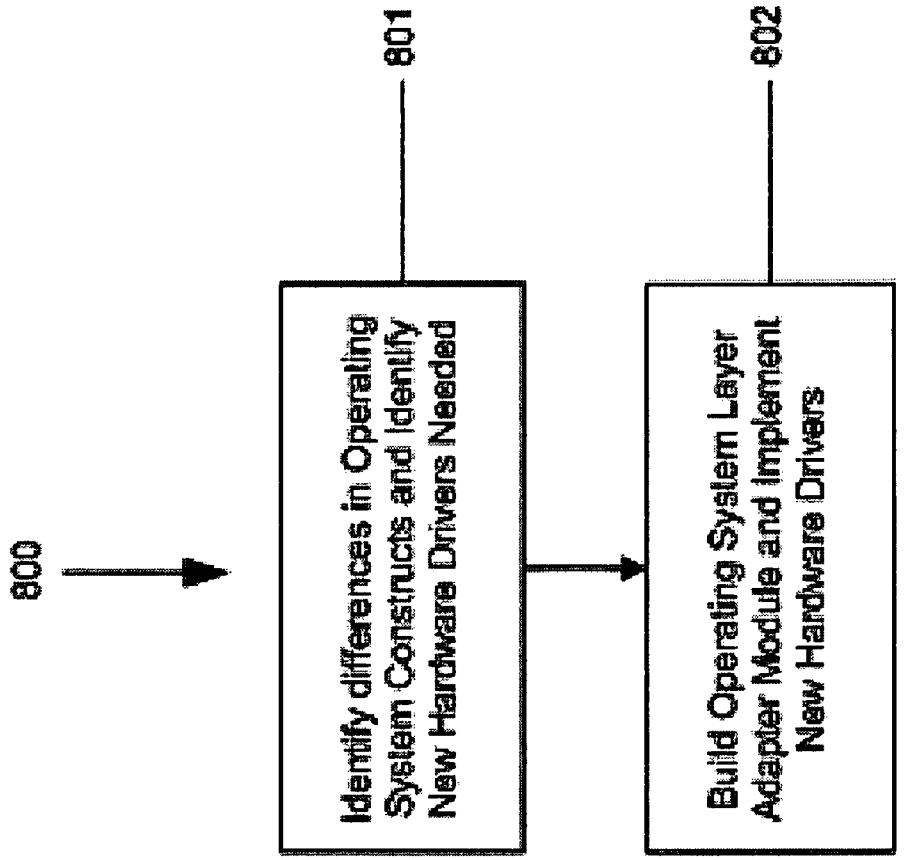
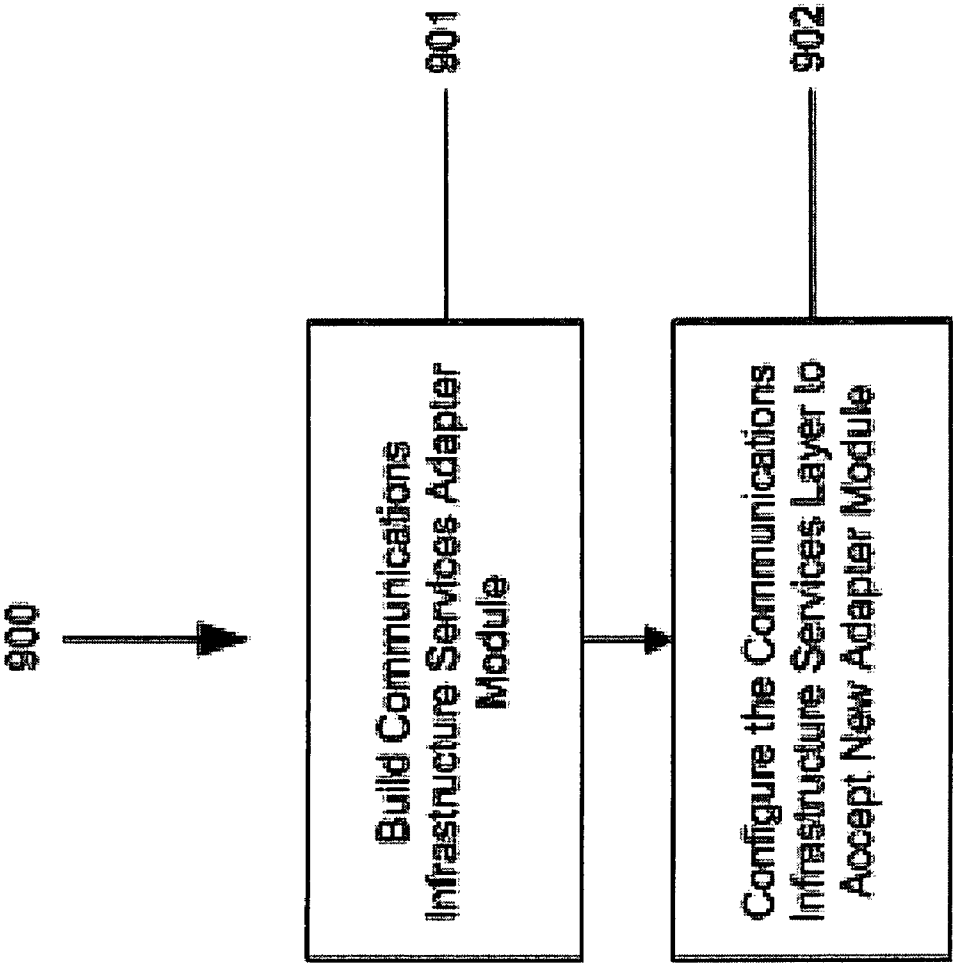

800
801
Identify differences in Operating System Constructs and Identify New Hardware Drivers Needed
802
Build Operating System Layer Adapter Module and Implement New Hardware Drivers

Figure 9


900
Build Communications Infrastructure Services Adapter Module
901
Configure the Communications Infrastructure Services Layer to Accept New Adapter Module
902

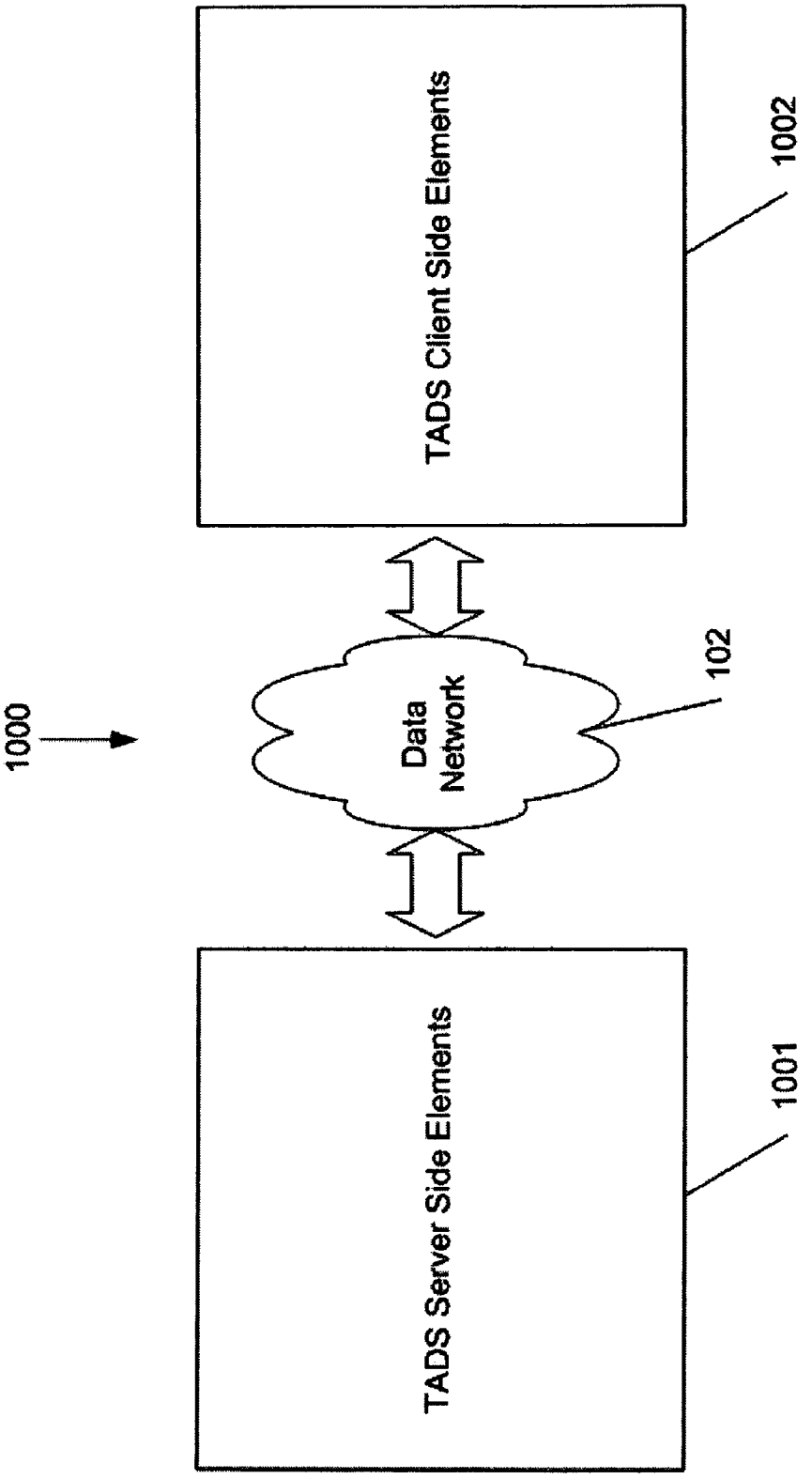
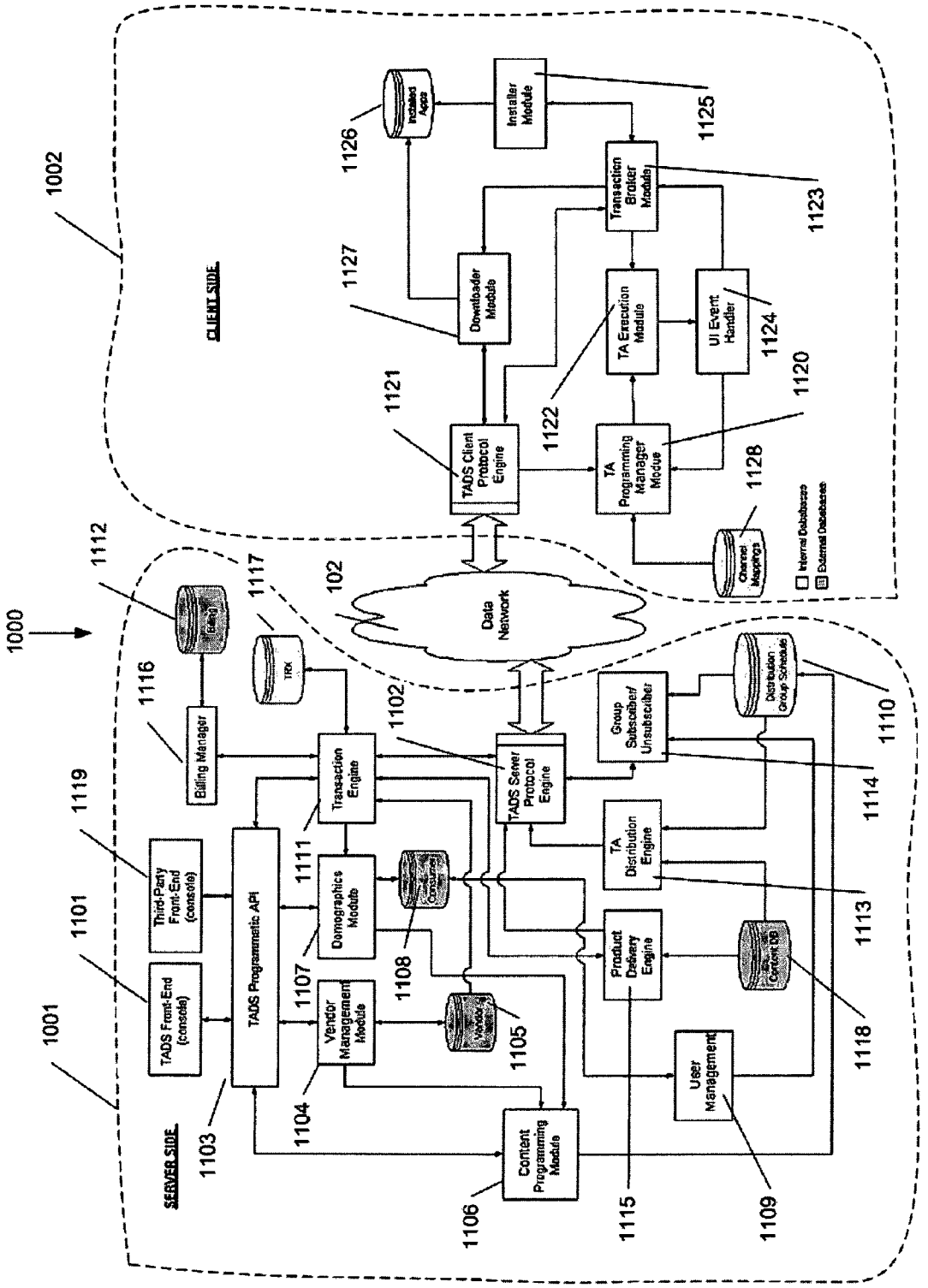

TADS Client Side Elements
1002
1000
Data Network
102
TADS Server Side Elements
1001

Figure 10

Figure 11


1000
1001
1002
CLIENT SIDE
SERVER SIDE
Data Network
Installer Module
Installed Apps
Transaction Broker Module
Downloader Module
TA Execution Module
UI Event Handler
TADS Client Protocol Engine
TA Programming Manager Module
Channel Mappings
Internal Databases
External Databases
Files
TRX
Billing Manager
Transaction Engine
TADS Server Protocol Engine
Group Subscribe/ Unsubscribe
Distribution Group Schedule
Third-Party Front-End (console)
TADS Front-End (console)
TADS Programmatic API
Demographics Module
Vendor Management Module
TA Distribution Engine
Product Delivery Engine
User Management
Content Programming Module
1101
1102
1103
1104
1105
1106
1107
1108
1109
1110
1111
1112
1113
1114
1115
1116
1117
1118
1119
1120
1121
1122
1123
1124
1125
1126
1127
1128

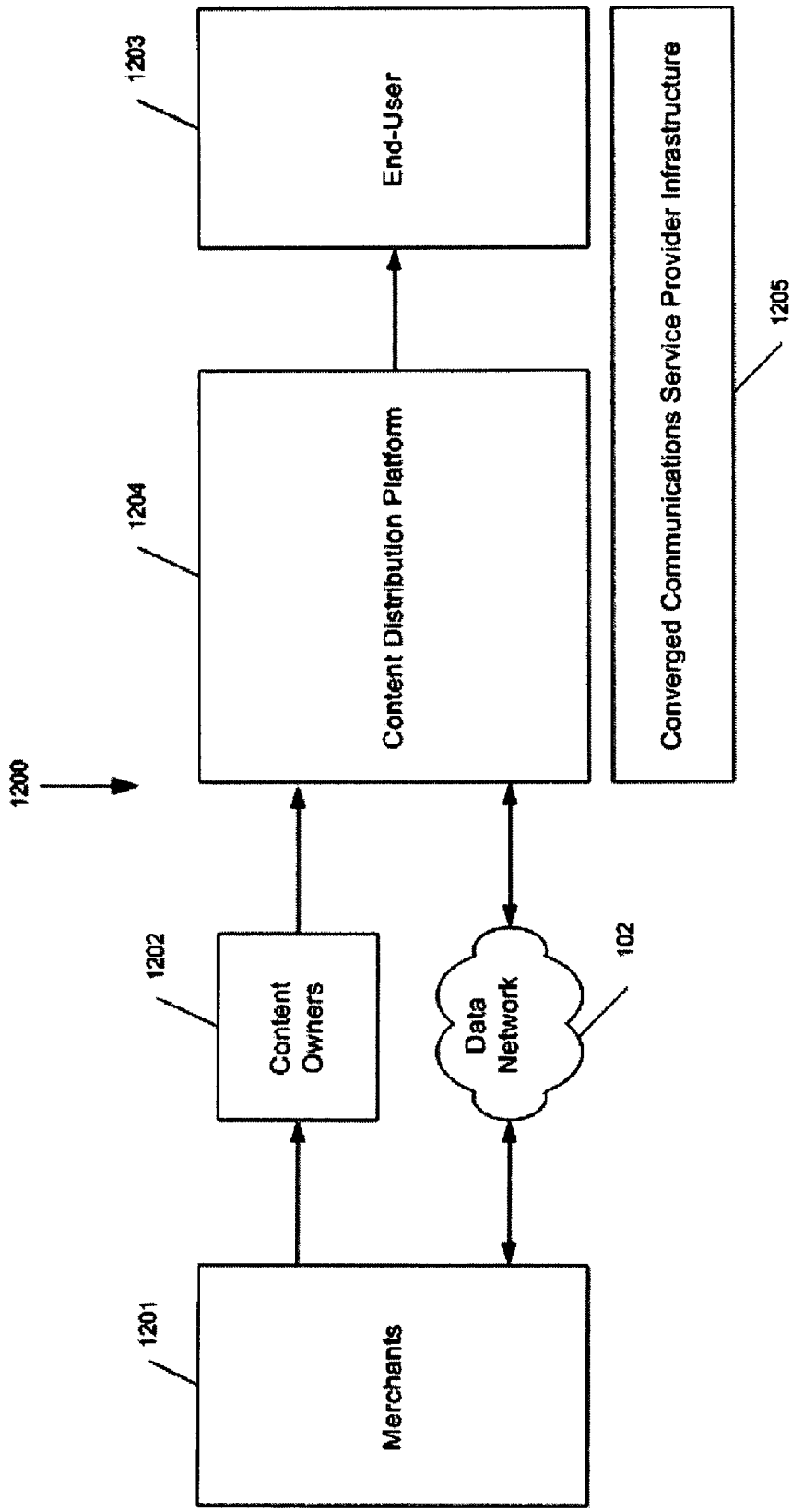

1203
End-User
1205
Converged Communications Service Provider Infrastructure
1204
Content Distribution Platform
1200
1202
Content Owners
Data Network
102
1201
Merchants

Figure 12

Figure 13

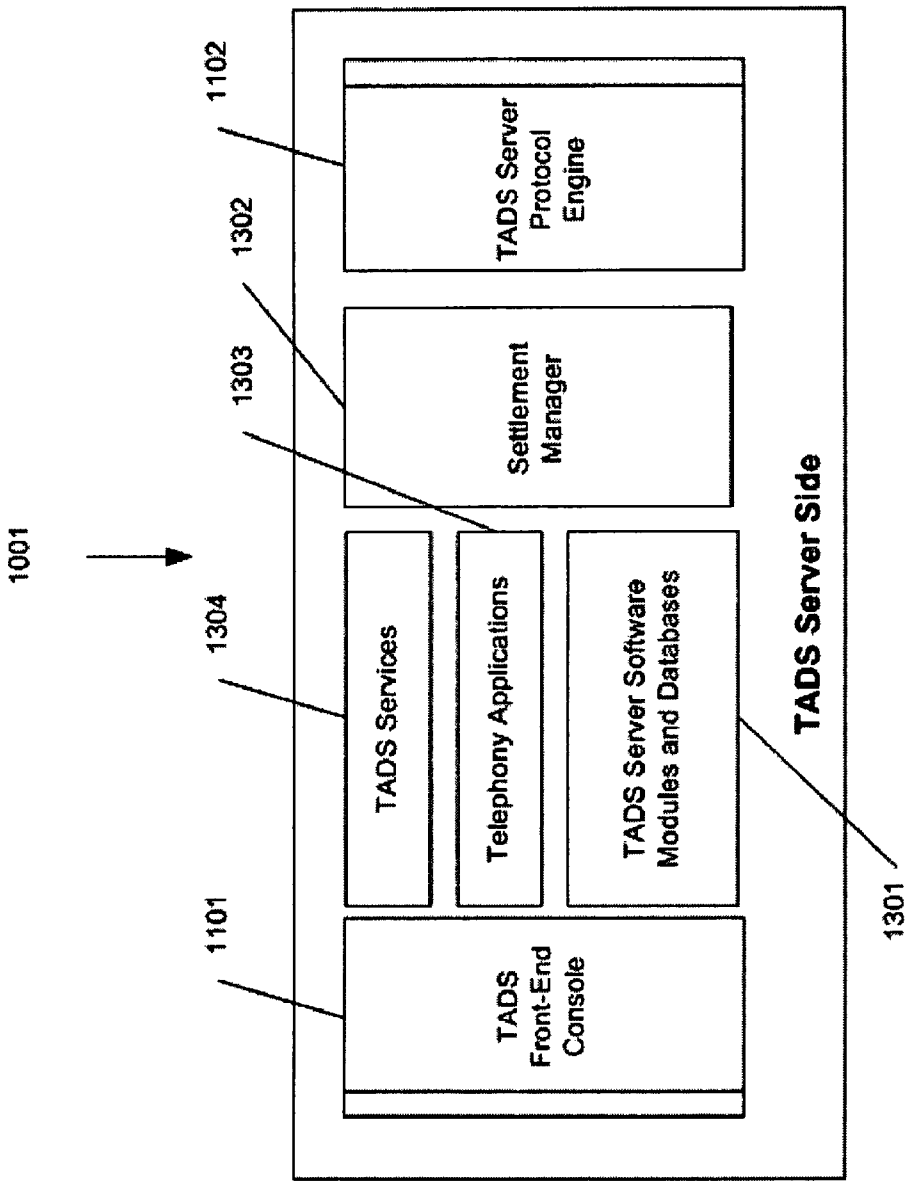

1001
1102
TADS Server Protocol Engine
1302
Settlement Manager
1303
TADS Services
1304
Telephony Applications
TADS Server Software Modules and Databases
TADS Server Side
1101
TADS Front-End Console
1301

Figure 14

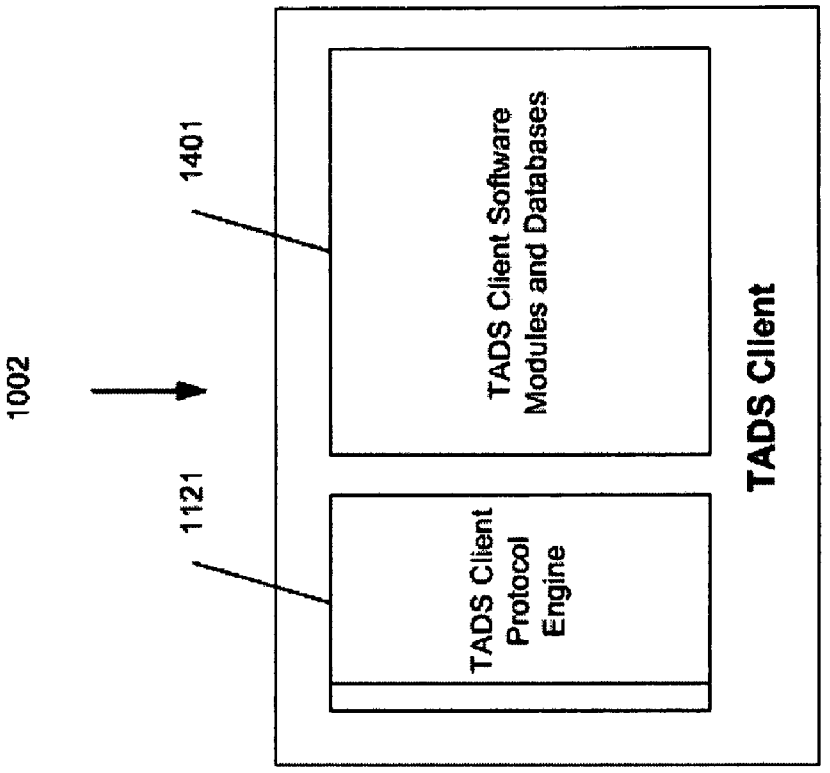

1002
1401
1121
TADS Client Software Modules and Databases
TADS Client Protocol Engine
TADS Client

Figure 15

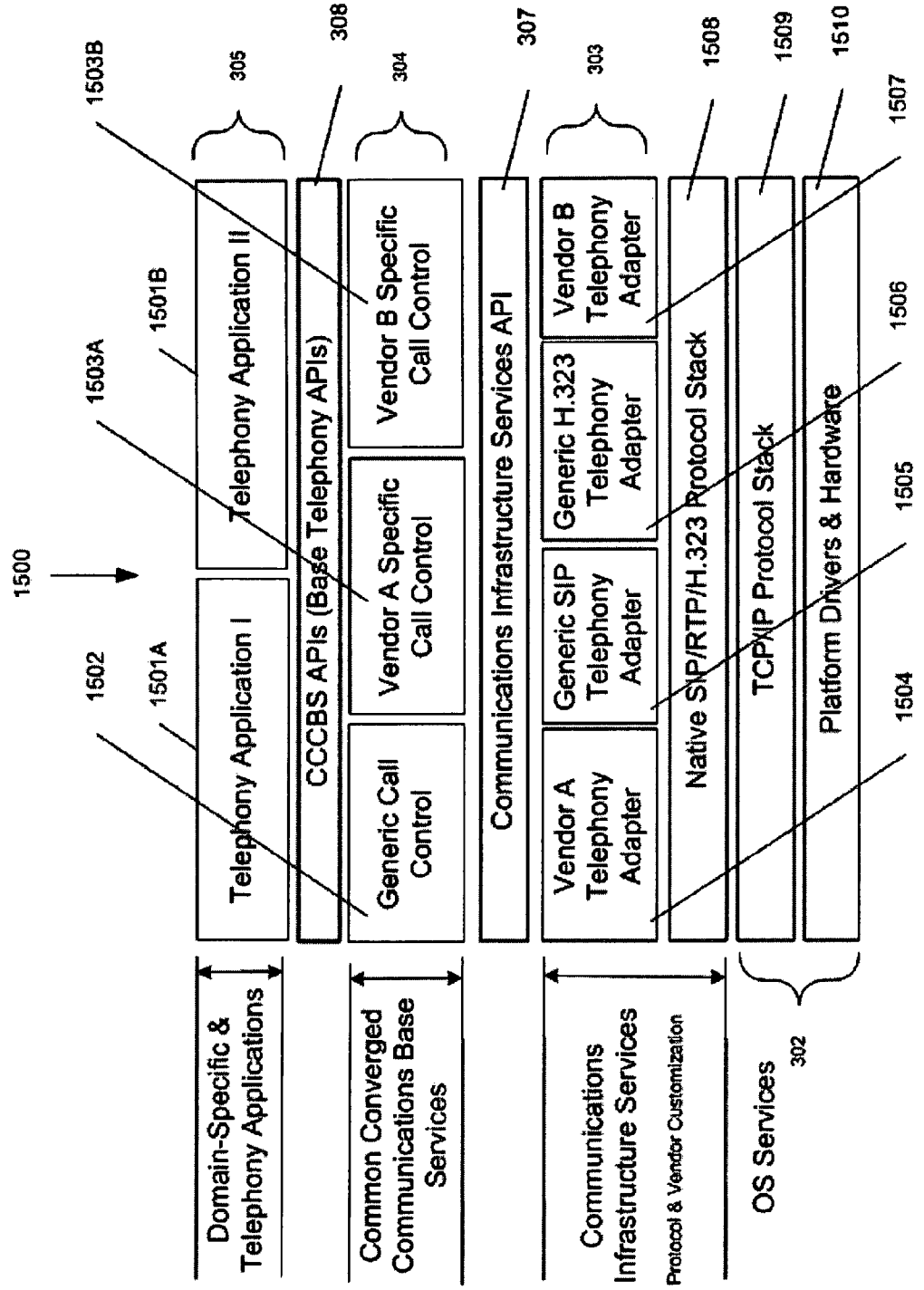

1500
1502
1501A
1501B
1503A
1503B
1504
1505
1506
1507
1508
1509
1510
305
308
304
307
303
Telephony Application I
Telephony Application II
CCCBS APIs (Base Telephony APIs)
Generic Call Control
Vendor A Specific Call Control
Vendor B Specific Call Control
Communications Infrastructure Services API
Vendor A Telephony Adapter
Generic SIP Telephony Adapter
Generic H.323 Telephony Adapter
Vendor B Telephony Adapter
Native SIP/RTP/H.323 Protocol Stack
TCP/IP Protocol Stack
Platform Drivers & Hardware
Domain-Specific & Telephony Applications
Common Converged Communications Base Services
Communications Infrastructure Services
Protocol & Vendor Customization
OS Services
302

Figure 16

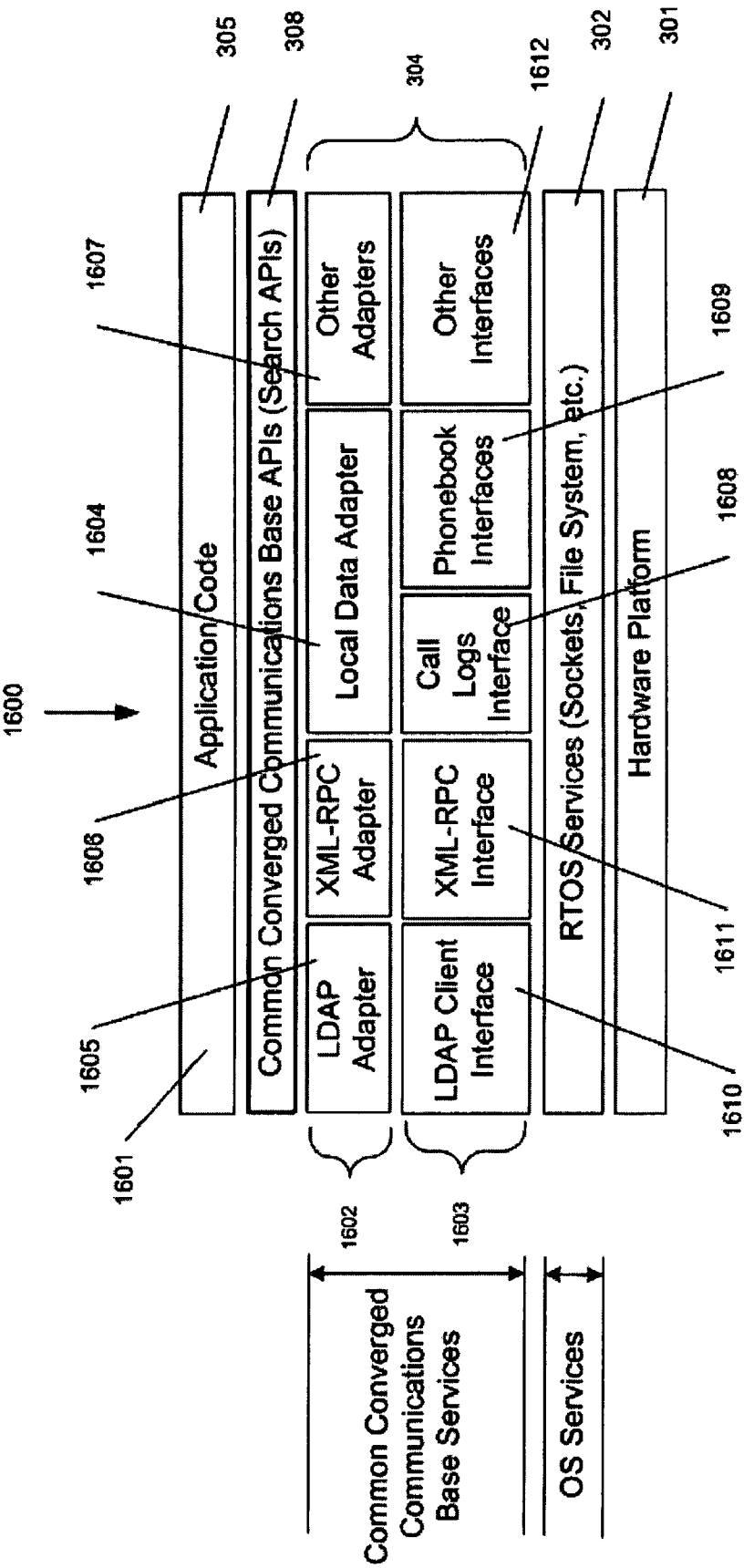

1600
1601
1602
1603
1604
1605
1606
1607
1608
1609
1610
1611
1612
301
302
304
305
308
Application Code
Common Converged Communications Base APIs (Search APIs)
LDAP Adapter
XML-RPC Adapter
Local Data Adapter
Other Adapters
LDAP Client Interface
XML-RPC Interface
Call Logs Interface
Phonebook Interfaces
Other Interfaces
RTOS Services (Sockets, File System, etc.)
Hardware Platform
Common Converged Communications Base Services
OS Services

Figure 17

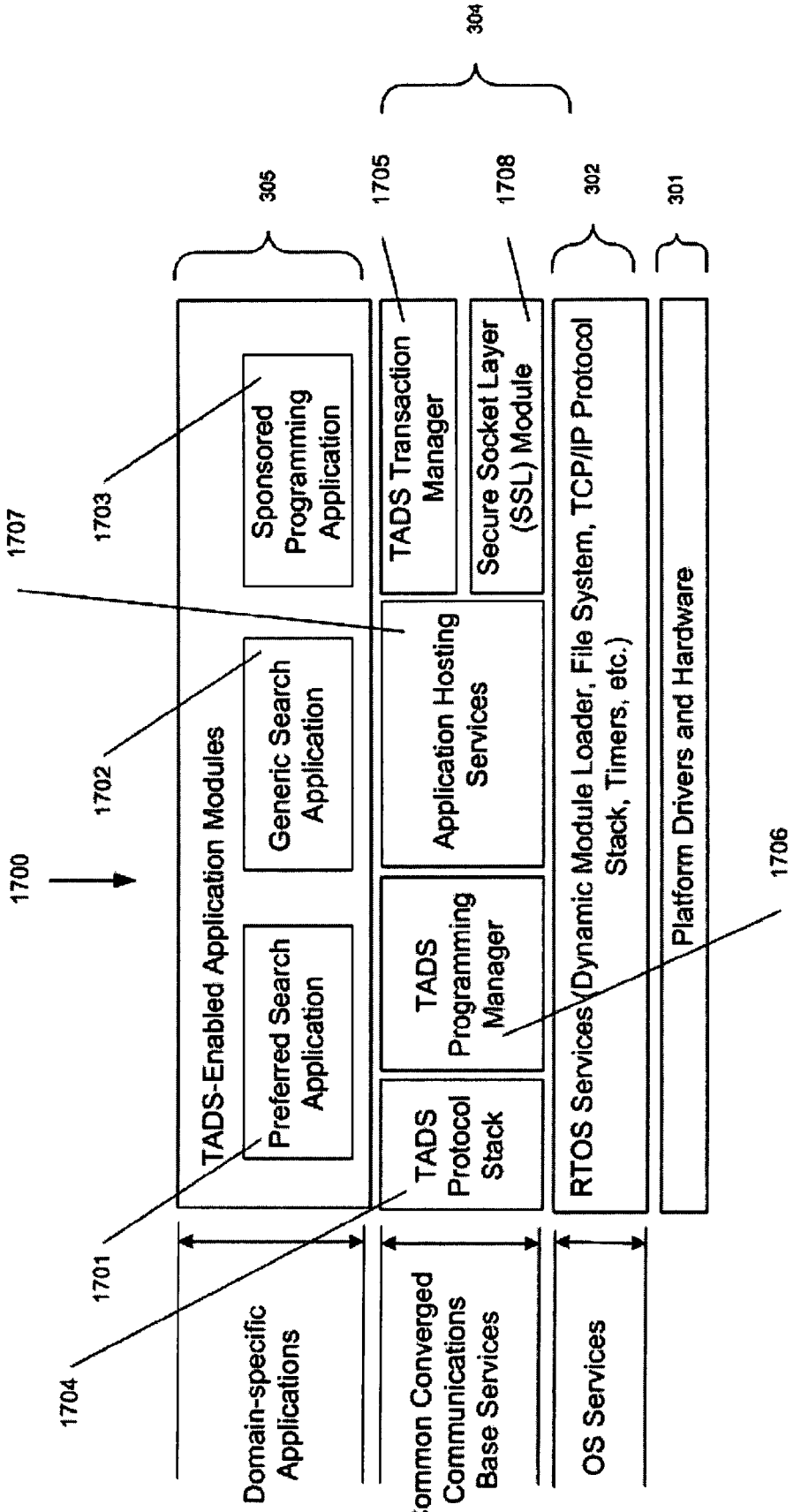

1700
1701
1702
1703
1704
1705
1706
1707
1708
301
302
304
305
Domain-specific Applications
Common Converged Communications Base Services
OS Services
TADS-Enabled Application Modules
Preferred Search Application
Generic Search Application
Sponsored Programming Application
TADS Protocol Stack
TADS Programming Manager
Application Hosting Services
TADS Transaction Manager
Secure Socket Layer (SSL) Module
RTOS Services (Dynamic Module Loader, File System, TCP/IP Protocol Stack, Timers, etc.)
Platform Drivers and Hardware

Figure 18

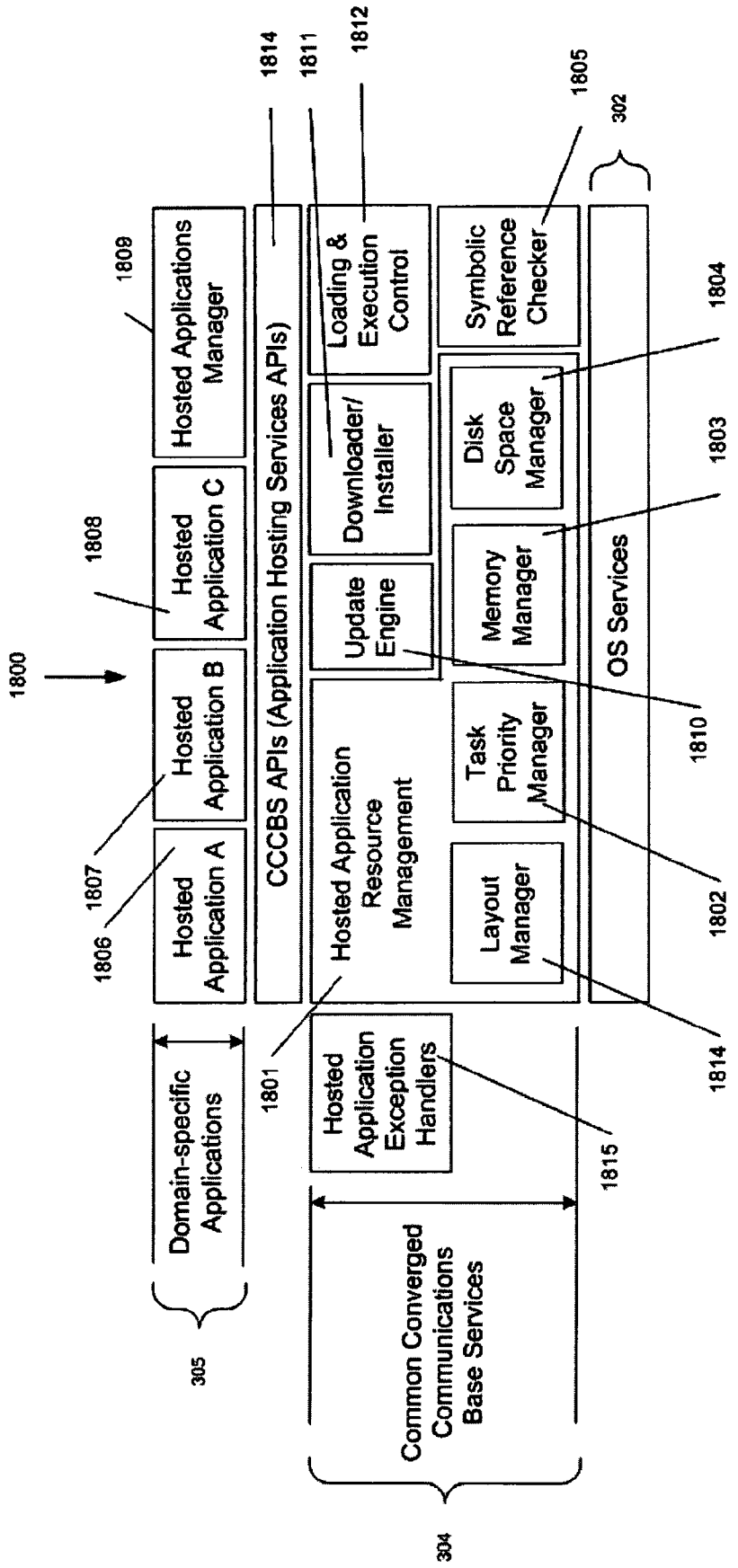

1800
1801
1802
1803
1804
1805
1806
1807
1808
1809
1810
1811
1812
1814
1815
302
304
305
Hosted Application A
Hosted Application B
Hosted Application C
Hosted Applications Manager
CCCBS APIs (Application Hosting Services APIs)
Hosted Application Resource Management
Update Engine
Downloader/ Installer
Loading & Execution Control
Layout Manager
Task Priority Manager
Memory Manager
Disk Space Manager
Symbolic Reference Checker
OS Services
Hosted Application Exception Handlers
Domain-specific Applications
Common Converged Communications Base Services

Figure 19

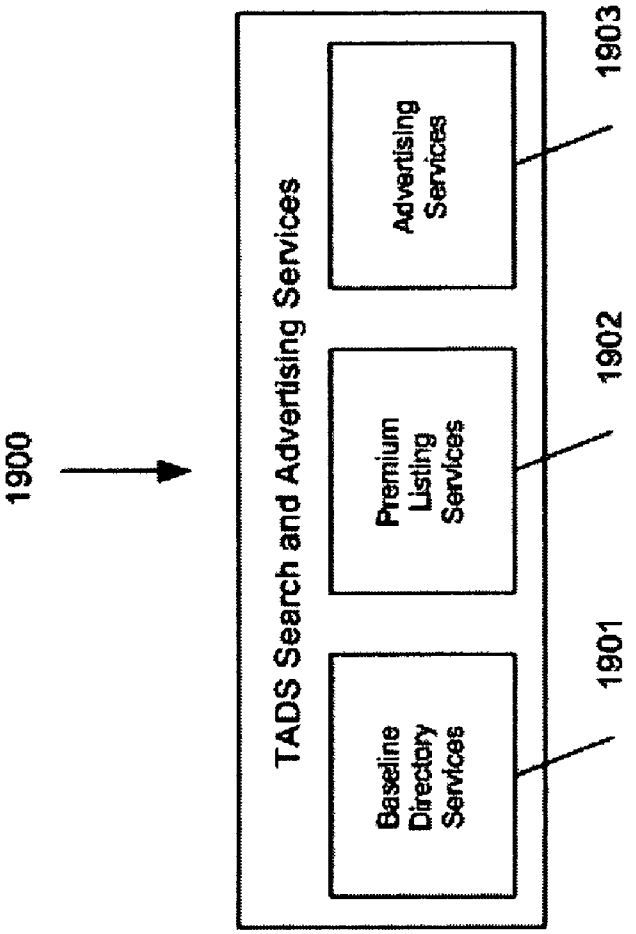

1900
TADS Search and Advertising Services
Baseline Directory Services
Premium Listing Services
Advertising Services
1901
1902
1903

Figure 20

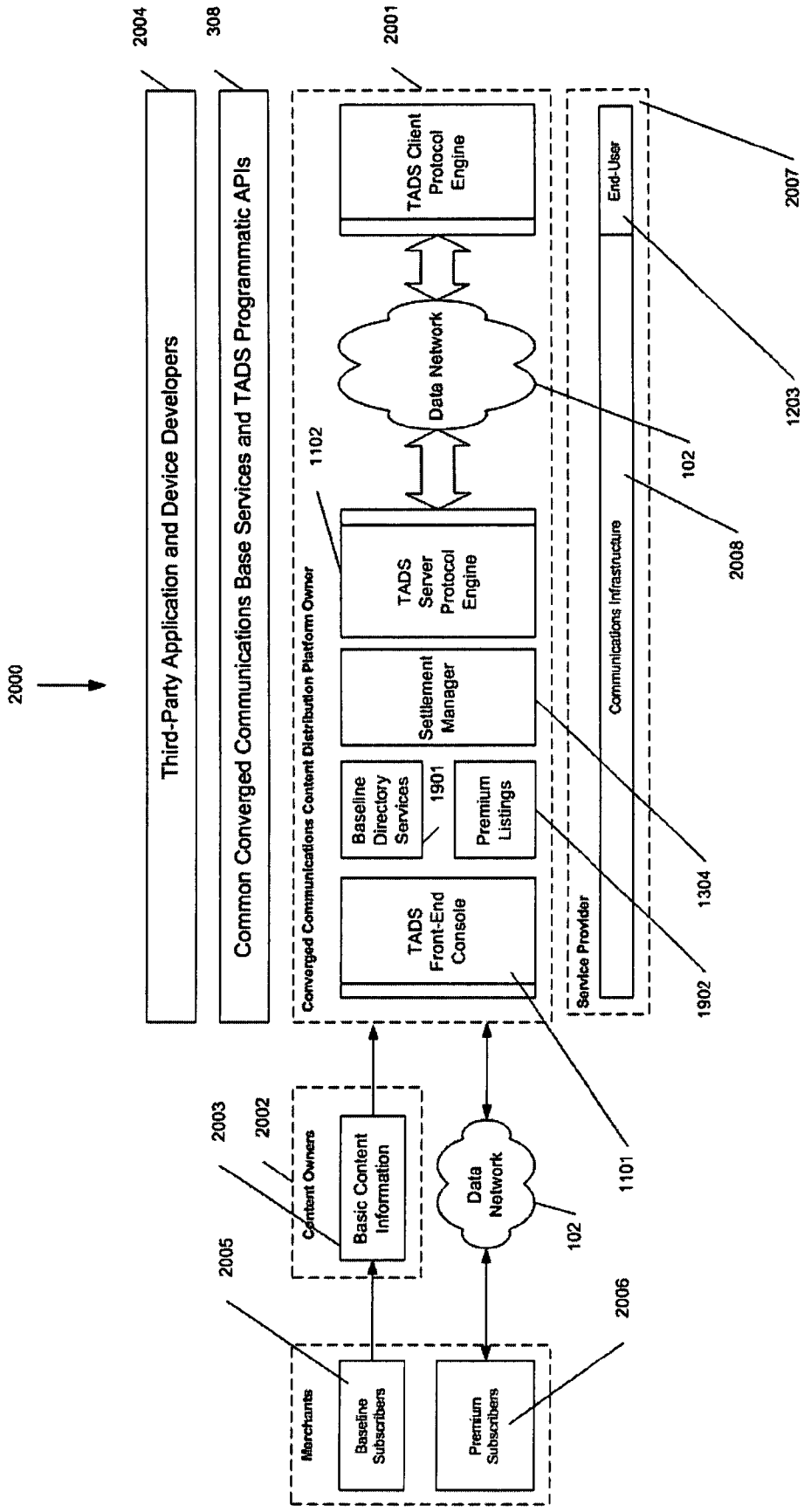

2000
2004
308
2001
Third-Party Application and Device Developers
Common Converged Communications Base Services and TADS Programmatic APIs
Converged Communications Content Distribution Platform Owner
1102
TADS Client Protocol Engine
Data Network
TADS Server Protocol Engine
Settlement Manager
Baseline Directory Services
1901
Premium Listings
TADS Front-End Console
Service Provider
End-User
Communications Infrastructure
2007
1203
102
2008
1304
1902
1101
2003
2002
Content Owners
Basic Content Information
Data Network
102
2005
2006
Merchants
Baseline Subscribers
Premium Subscribers

Figure 21

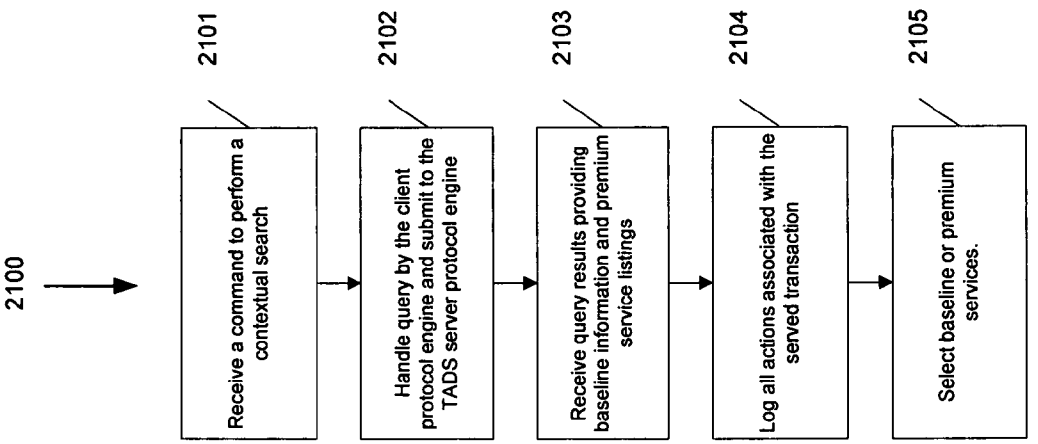

2100
2101
Receive a command to perform a contextual search
2102
Handle query by the client protocol engine and submit to the TADS server protocol engine
2103
Receive query results providing baseline information and premium service listings
2104
Log all actions associated with the served transaction
2105
Select baseline or premium services.

Figure 22

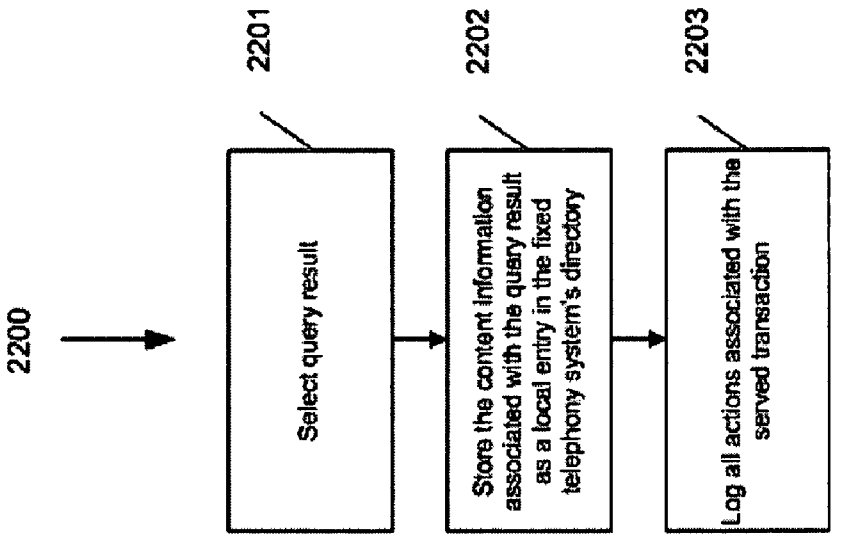

2200
2201
Select query result
2202
Store the content information associated with the query result as a local entry in the fixed telephony system's directory
2203
Log all actions associated with the served transaction

Figure 23

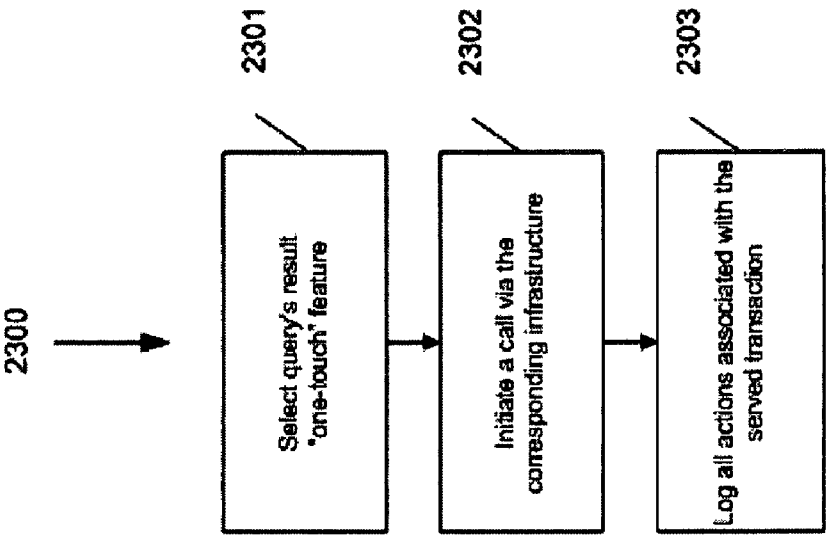

2300
2301
Select query's result "one-touch" feature
2302
Initiate a call via the corresponding infrastructure
2303
Log all actions associated with the served transaction

Figure 24

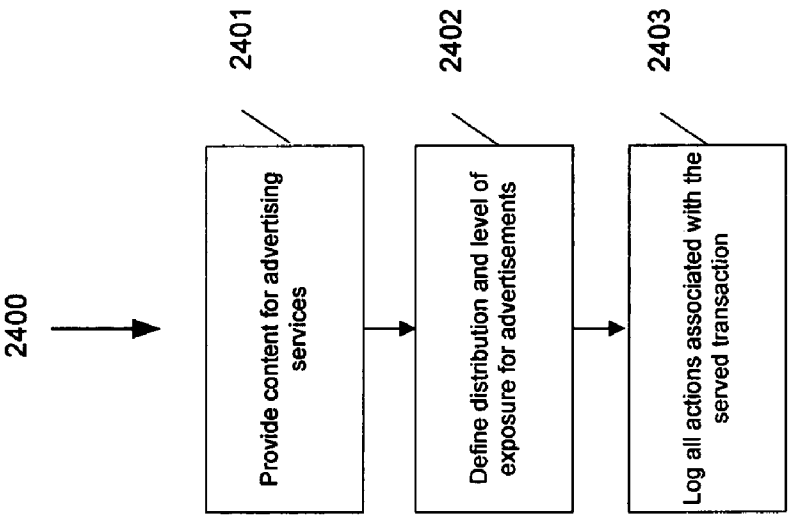

2400
2401
Provide content for advertising services
2402
Define distribution and level of exposure for advertisements
2403
Log all actions associated with the served transaction

Figure 25

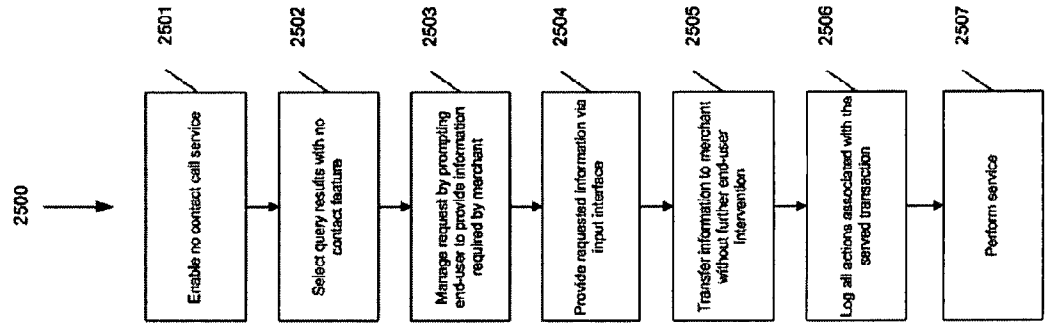
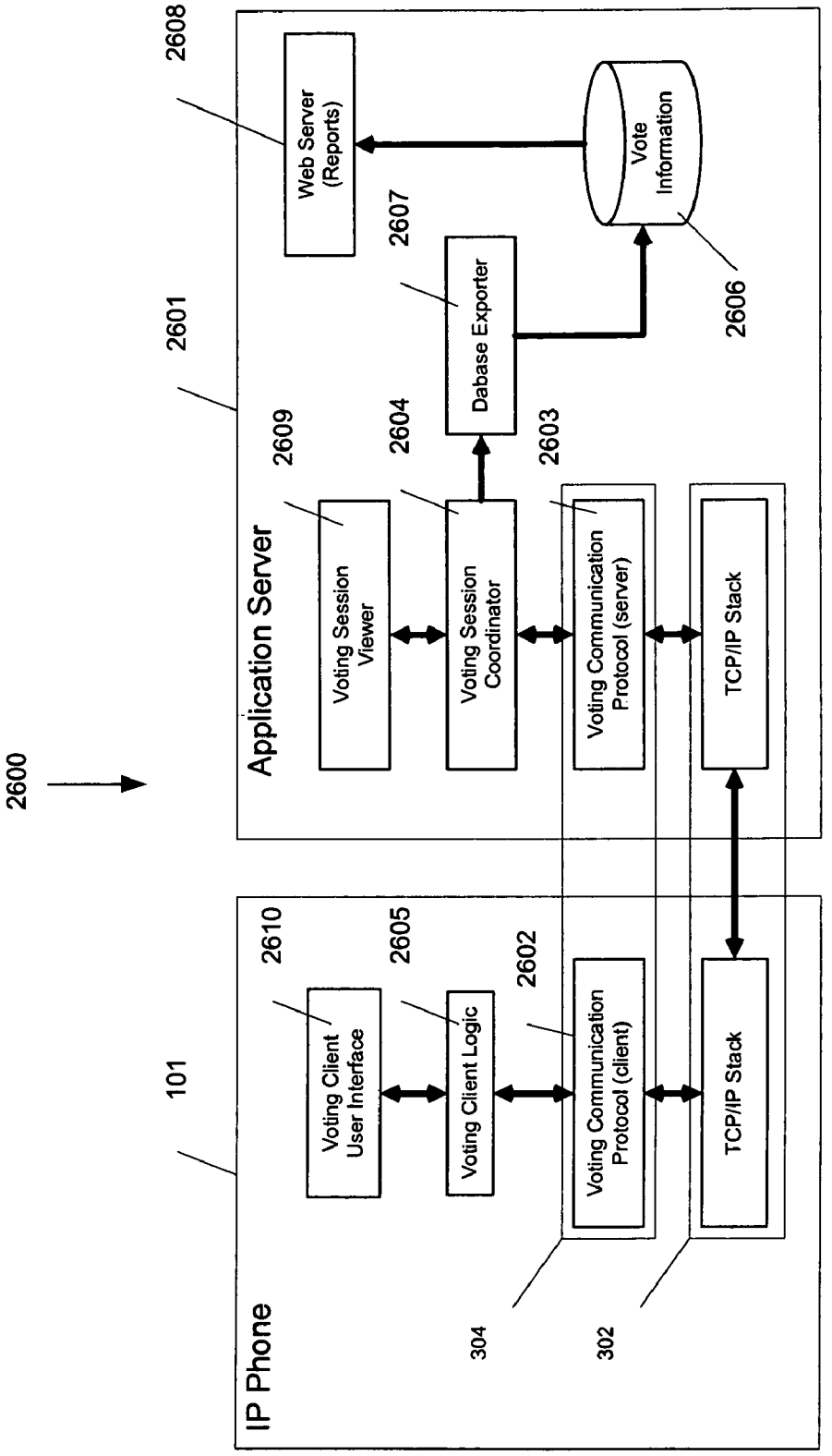

2500
2501
Enable no contact call service
2502
Select query results with no contact feature
2503
Manage request by prompting end-user to provide information required by merchant
2504
Provide requested information via input interface
2505
Transfer information to merchant without further end-user intervention
2506
Log all actions associated with the served transaction
2507
Perform service

Figure 26


2600
2608
Web Server (Reports)
2607
Vote Information
2606
2601
Application Server
2609
2604
Dabase Exporter
2603
Voting Session Viewer
Voting Session Coordinator
Voting Communication Protocol (server)
TCP/IP Stack
101
2610
2605
2602
Voting Client User Interface
Voting Client Logic
Voting Communication Protocol (client)
TCP/IP Stack
IP Phone
304
302

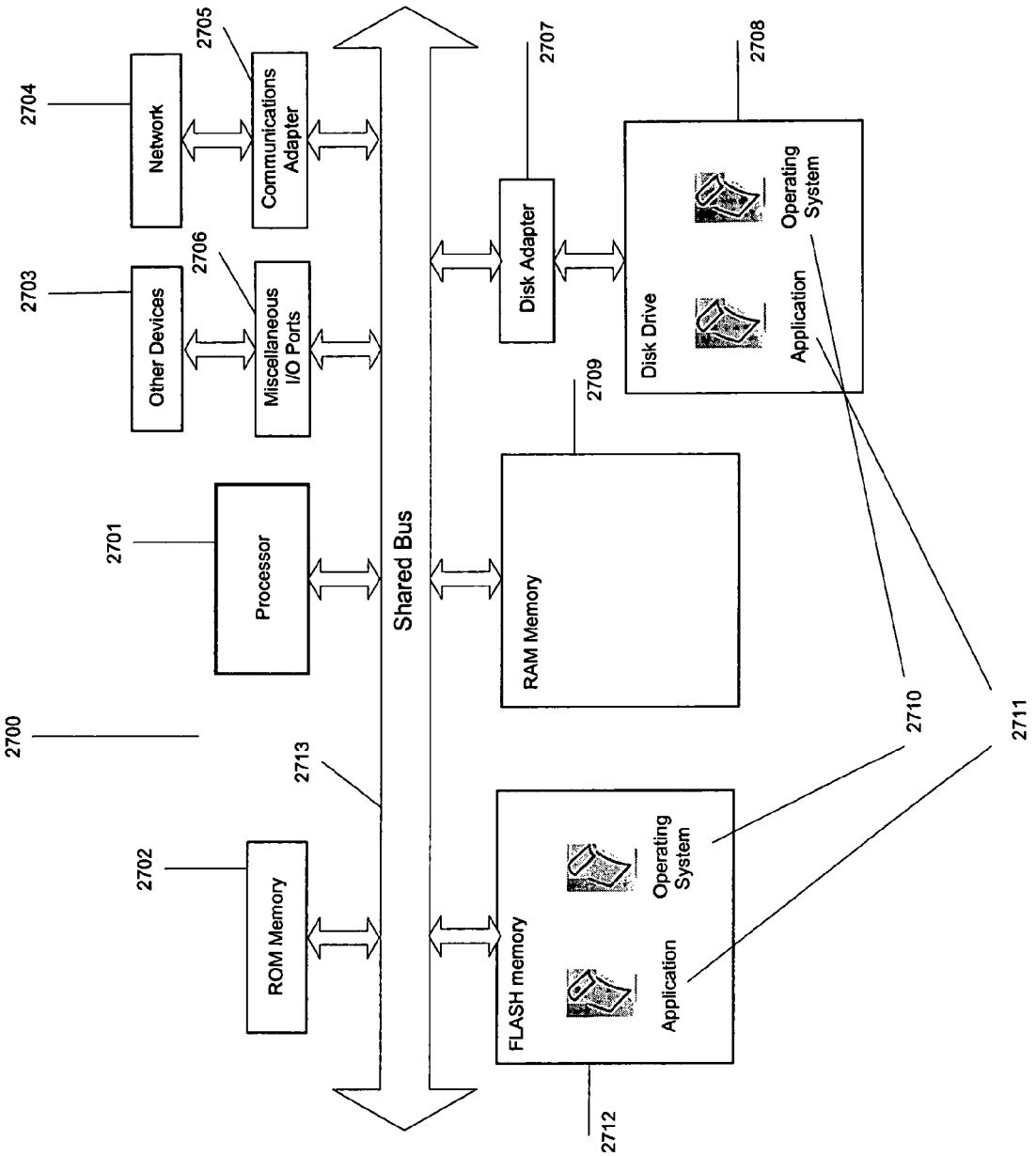

2700
2701
Processor
2702
ROM Memory
2703
Other Devices
2704
Network
2705
Communications Adapter
2706
Miscellaneous I/O Ports
2707
Disk Adapter
2708
Disk Drive
Operating System
Application
2709
RAM Memory
2710
2711
2712
FLASH memory
Operating System
Application
2713
Shared Bus

Figure 27

INTERNET PROTOCOL (IP) PHONE WITH SEARCH AND ADVERTISING CAPABILITY

PRIORITY BENEFIT AND CROSS REFERENCE TO RELATED APPLICATIONS

This application is related to the following commonly owned copending U.S. Patent Applications:

Provisional Application Ser. No. 60/554,548, "Method For Rapid Development Of Differentiated Converged Communications Terminals Based On A Flexible Software Platform", filed Mar. 19, 2004, and claims the benefit of its earlier filing date under 35 U.S.C. 119(e).

Provisional Application Ser. No. 60/554,544, "Flexible Software Platform For Differentiated Converged Communications Terminals", filed Mar. 19, 2004, and claims the benefit of its earlier filing date under 35 U.S.C. 119(e).

TECHNICAL FIELD

The present invention relates to the field of an internet phone system, and more particularly to an Internet Protocol ("IP") phone with search and advertising capability that includes a platform adaptable to be used with different applications running on the IP phone as well as adaptable to be used with different communication infrastructures.

BACKGROUND INFORMATION

Recently, multimedia communication in which voice, video and data information are transmitted and received using the Internet Protocol (IP) is carried over an IP network. A phone, referred to herein as an "IP phone" or more generally as a "converged communications terminal" may be connected directly to the IP network over which a multimedia phone exchange system can be constructed. An IP phone is a telephone which can operate and execute voice communication in the same way as conventional telephones either via a Plain Old Telephone System (POTS) or an IP network. Further, the IP phone can use the IP network for data applications. For example, IP phones may be connected to an IP network, such as a local area network, in an office environment thereby using the network as a private telephone network circuit and as a data exchange network. In another example, IP phones may use a wide area network, e.g., Internet, to communicate with other properly configured IP phones for data-voice exchanges. In another example, IP phones may use a data network for transactional data applications and the POTS network for voice.

IP phones currently have features similar to those found in traditional public switched telephone network (PSTN) phones such as call forwarding, call waiting, conference calls and so forth. Enhancements to these feature sets have been slow in coming, as market leaders in the "Voice over IP" (VoIP) telephony field have pursued an incremental approach to their product offerings, particularly because of the lack of computing power available in VoIP platforms. Currently, VoIP platforms may have to be specifically designed for a target market area and software application operating on the IP phone. For example, a unique VoIP platform may have to be developed to operate a software application used to allow the user of the IP phone to vote on an election. A separate unique VoIP platform may have to be developed to operate a hospitality application used for saving voice messages, issuing wake-up calls, scheduling room service, tracking complaints, etc. By having to design and implement separate VoIP platforms for each application operating on the IP phone, the cost in operating different applications on an IP phone may be prohibitive.

Furthermore, current IP phones are not adaptable to be used with different communication infrastructures, such as broadband, wireless communication and POTS service. For example, current IP phones may not be able to connect to a broadband modem to access a software application while also being connected to a POTS line to access voice. By not being able to access multiple different communication infrastructures concurrently, the user of an IP phone is limited on the uses of the IP phone.

Further, current users of an IP phone do not have the ability to perform searches such as in a contextual advertisement space on the IP phone. 27% of all on-line searches are aimed at finding local services or businesses, while 2 out of 3 small and medium size businesses still rely heavily on the phone for sales leads. There appears to be a strong demand for allowing the user of an IP phone to locate a business with ease such as in a contextual advertisement space while at the same time allowing the businesses to target advertisements to consumers with broadband connections to the home for data and either VoIP or POTS service for voice.

Therefore, there is a need in the art for an IP phone configured with a VoIP platform that can support different applications operating on the IP phone. Further, there is a need in the art for an IP phone that is adaptable to be used concurrently with various communication infrastructures. Further, there is a need in the art for an IP phone with the capability of implementing features beyond those found in traditional PSTN phones, such as the ability to perform searches and advertising.

SUMMARY

The problems outlined above may at least in part be solved in some embodiments by a software platform in an IP phone having the ability to be used with different communication infrastructures such as broadband, wireless communication, POTS service. Further, the software platform in the IP phone has the ability to be used with different applications operating on the IP phone. Further, the IP phone has the ability to perform additional functionality than traditional PSTN phones, such as searches and advertising, given its ability to converge voice and data within a single terminal as described herein.

In one embodiment of the present invention, a system comprises an Internet Protocol (IP) phone coupled to a server where the IP phone is configured to receive contextual information from the server. The IP phone may comprise a memory unit operable for storing a computer program for performing contextual searches. The IP phone may further comprise a processor coupled to the memory unit where the processor, responsive to the computer program, comprises circuitry for receiving a command to perform a contextual search. The processor may further comprise circuitry for receiving search criteria. The processor may further comprise circuitry for submitting the search criteria to the server. The processor may further comprise circuitry for receiving from the server a list of merchants matching the search criteria and information regarding each of the merchants in the list.

In another embodiment of the present invention, a system comprises an Internet Protocol (IP) phone coupled to a server where the IP phone is configured to receive a ballot from the server. The IP phone comprises a memory unit operable for storing a computer program for performing a vote on the ballot. The IP phone may further comprise a processor

coupled to the memory unit where the processor, responsive to the computer program, comprises circuitry for receiving the ballot from the server. The processor may further comprise circuitry for selecting either yes, no or abstain for each issue on the ballot. The processor may further comprise circuitry for submitting the selections for each issue on the ballot to the server.

In another embodiment of the present invention, a system comprises an Internet Protocol (IP) phone comprising a software platform where the software platform comprises a first layer controlling a hardware configuration of the IP phone. The software platform may further comprise a second layer interacting with the first layer. The second layer may provide an execution environment. The software platform may further comprise a third layer interacting with the second layer. The third layer may interface with multiple communication infrastructures. The software platform may further comprise a fourth layer interfacing with the third layer. The fourth layer may provide communication services and data services required by applications. The software platform may further comprise a fifth layer interfacing with the fourth layer. The fifth layer may implement logic used to run applications operating on the IP phone.

In another embodiment of the present invention, a method for developing domain-specific applications for Internet Protocol (IP) phone may comprise the step of defining a requirement specification for an application. The method may further comprise identifying features of a first software layer in a software platform of an IP phone to be incorporated into the application. The first software layer may be configured to provide communication services and data services required by the application. The method may further comprise enabling the identified features in the first layer in the software platform of the IP phone. The method may further comprise building a client interface to allow features required for the application to be implemented but are not covered by the first layer to collaborate with the first layer in the software platform of the IP phone. The method may further comprise implementing the features not covered by the first layer but are required for the application to be implemented.

In another embodiment of the present invention, a system comprises a server where the server comprises a front-end console configured to present a selective view of all data accessible. The server may further comprise a transaction engine coupled to the front-end console where the transaction engine is configured to handle transactions from an Internet Protocol (IP) phone coupled to the server. The server may further comprise a plurality of databases coupled to the transaction engine where the plurality of databases is configured to store sales information, records of transactions, vendor information, consumer information and scheduling information as to when transaction applications are distributed. The server may further comprise a settlement manager coupled to the front-end console and the transaction engine. The settlement manager may be configured to maintain a log of actions performed by a user of the IP phone during a communication session with the server.

The foregoing has outlined rather generally the features and technical advantages of one or more embodiments of the present invention in order that the detailed description of the present invention that follows may be better understood. Additional features and advantages of the present invention will be described hereinafter which may form the subject of the claims of the present invention.

BRIEF DESCRIPTION OF THE DRAWINGS

A better understanding of the present invention can be obtained when the following detailed description is considered in conjunction with the following drawings, in which:

FIG. **1** illustrates an embodiment of the present invention of a system implementing a multi-layer fixed telephone system interacting with different communication infrastructures;

FIG. **2** illustrates an embodiment of the present invention of an external configuration of an IP phone;

FIG. **3** illustrates the software platform of the IP phone in accordance with an embodiment of the present invention;

FIG. **4** illustrates an embodiment of the present invention of the communication infrastructure services layer of the software platform of the IP phone;

FIG. **5** illustrates an embodiment of the present invention of the common converged communication base services layer of the software platform of the IP phone;

FIG. **6** illustrates an embodiment of the present invention of the domain-specific application layer of the software platform of the IP phone;

FIG. **7** is a flowchart of a method for developing domain-specific applications for converged communication terminals (IP phones) based on the software platform in accordance with an embodiment of the present invention;

FIG. **8** is a flowchart of a method by which one or more domain-specific applications developed for a specific IP phone are rapidly retargeted to a new hardware platform and/or operating system based on the software platform in accordance with an embodiment of the present invention;

FIG. **9** is a flowchart of a method by which one or more domain-specific applications developed for a specific IP phone are rapidly retargeted to a new communications infrastructure based on the software platform in accordance with an embodiment of the present invention;

FIG. **10** illustrates an embodiment of the present invention of a client-server Transaction Applications Delivery Services (TADS) communications architecture;

FIG. **11** illustrates an embodiment of the present invention of the server and cli ent sides of a transactional application delivery system;

FIG. **12** illustrates an embodiment of the present invention of end-to-end services that enable contextual search and advertising service delivery to IP phones;

FIG. **13** illustrates an embodiment of the present invention of a transactional application delivery system server side elements;

FIG. **14** illustrates an embodiment of the present invention of a transactional application delivery system client side elements;

FIG. **15** illustrates an embodiment of the present invention of a telephony services architecture;

FIG. **16** illustrates an embodiment of the present invention of a directory services architecture;

FIG. **17** illustrates an embodiment of the present invention of how transactional applications in a domain-specific applications layer are supported by the software modules in the converged communication base services layer of the software platform of the IP phone;

FIG. **18** illustrates an embodiment of the present invention of a transactional application delivery system services architecture.

FIG. **19** illustrates an embodiment of the present invention of a transactional application delivery system (TADS) directory search and advertising services;

FIG. **20** illustrates an embodiment of the present invention of monetizing baseline directory services, premium listing services and advertising services;

FIG. **21** is a flowchart of a method for performing contextual search in accordance with an embodiment of the present invention;

FIG. **22** is a flowchart of a method for performing a local save in accordance with an embodiment of the present invention;

FIG. **23** is a flowchart of a method for performing one-touch call in accordance with an embodiment of the present invention;

FIG. **24** is a flowchart of a method for scheduling advertisements in accordance with an embodiment of the present invention;

FIG. **25** is a flowchart of a method for enabling no contact call service functionality of select premium listings in accordance with an embodiment of the present invention;

FIG. **26** illustrates an embodiment of the present invention of the interaction between an IP phone and a voting application server used in implementing a voting booth application; and

FIG. **27** is an embodiment of the present invention of a hardware configuration of an IP phone.

DETAILED DESCRIPTION

Although the present invention is described with reference to an Internet Protocol (IP) phone it is noted that the principles of the present invention may be applied to any Internet connected device, such as an Internet appliance. It is further noted that embodiments applying the principles of the present invention to such Internet connected devices would fall within the scope of the present invention.

In the following description, numerous specific details are set forth to provide a thorough understanding of the present invention. However, it will be apparent to those skilled in the art that the present invention may be practiced without such specific details. In other instances, well-known circuits and software modules have been shown in block diagram form in order not to obscure the present invention in unnecessary detail. For the most part, details considering timing considerations and the like have been omitted inasmuch as such details are not necessary to obtain a complete understanding of the present invention and are within the skills of persons of ordinary skill in the relevant art.

FIG. **1** illustrates a high level diagram of an embodiment of the present invention of a system **100** implementing a multi-layer fixed telephone system **101** interacting with different communication infrastructures. Referring to FIG. **1**, system **100** allows multi-layer fixed telephone system **101** (referred to herein as an "IP phone") to interact with other entities over different communication infrastructures, such as data, voice, mobile and Public Switched Telephone Networks (PSTN) **102**, **103**, **114**, **105**, respectively, to provide telephony functions and run applications. A more detailed description of the external configuration of IP phone **101** is described below in association with FIG. **2**. Further, a more detailed description of the hardware configuration of IP phone **101** is described further below in association with FIG. **27**. In one embodiment, IP phone **101** may be coupled to a computer system **112**, data network **102** and a Public Switched Telephone Network (PSTN) **105**. IP phone **101** may communicate with third-party voice over IP (VoIP) terminals **116** via data network **102**. IP phone **101** may further communicate with an analog phone **113** over PSTN **105**. IP phone **101** may further communicate with analog phone **113** over voice network **103** via data network **102**. Further, IP phone **101** may communicate with a mobile phone **115** over mobile network **114** via data network **102**.

System **100** may further include a Public Switched Telephone Network (PSTN) Gateway **104** coupled to data network **102**. PSTN gateway **104** may be configured to translate signaling and media between data network **102** coupled to IP phone **101** and PSTN **105**. PSTN **105** may be coupled to conventional telephone **113**. PSTN gateway **104** may allow IP phone **101** to communicate with standard analog telephones **113** in PSTN **105**.

System **100** may further include a mobile gateway **106** coupled between data network **102** and mobile network **114**. Mobile gateway **106** may be configured to translate signaling and media between data network **102** and mobile network **114**. Mobile network **114** may be coupled to mobile telephone **115**. Mobile gateway **106** may allow IP phone **101** to communicate with mobile phones **115** in mobile network **114**. IP phone **101** may signal mobile gateway **106** in order to enable calls destined to mobile telephone **115** to be terminated on IP phone **101**.

System **100** may further include an Internet Protocol-Private Branch exchange (IP-PBX) **107** coupled to data network **102**, voice network **103** and analog phones **113** or VoIP network **116**. IP-PBX **107** may be configured to interconnect voice and data networks **103**, **102**, respectively, in an enterprise environment and provide centralized call control functionality.

System **100** may further include an application server **108** coupled to data network **102**. Application server **108** may be configured to contain the server side components (discussed further below) of client/server applications accessed through IP phone **101**, such as the components of the Transactional Application Delivery System (TADS) (discussed further below).

System **100** may further include a telephony services server **109** coupled to data network **102**. Telephony services server **109** may be configured to provide services that allow IP phone **101** to communicate with other analog and VoIP terminals and extend its range of available telephony features.

System **100** may further include a converged messaging and directory server **110** coupled to data network **102**. Converged messaging and directory server **110** may be configured to contain all the components necessary to provide the user with a unified converged platform to send and receive electronic and voice mail messages. In addition, server **110** may provide IP phone **101** with access to personal and public contact directories.

System **100** may further include a database repository **111** coupled to data network **102**. Database repository **111** may be configured to manage and provide IP phone **101** and servers **107**, **108**, **109** and **110** with data needed to perform their tasks.

It is noted that FIG. **1** is illustrative and that not all of the components of system **100** were depicted for the sake of brevity (e.g., provisioning and configuration servers). It is further noted that system **100** is not to be limited in scope to the system disclosed.

FIG. **2** illustrates an embodiment of the present invention of an external configuration of IP phone **101**. Referring to FIG. **2**, IP phone **101** includes a touch screen display **201** with the capability of displaying graphical images and collecting input from the user by pressing certain areas in the screen with a finger or an instrument designed for such purposes such as a stylus. IP phone **101** may further include a message waiting

indicator **202** to alert the user that a new message has arrived to the user's inbox. Below touch screen display **201**, IP phone **101** includes four directional keys **203**A-D (**203**A configured to move an image displayed on screen **201** up; **203**B configured to move an image displayed on screen **201** down; **203**C configured to move an image displayed on screen **201** to the left; and **203**D configured to move an image displayed on screen **201** to the right); and an OK button **204** to navigate the user interface screens **201** and select items in focus, as an alternative to using the touch screen. To each side of directional keys **203**A-D, IP phone **101** includes SEND and END keys **205**, **206**, respectively. Keys **205**, **206** may be used as an alternative to the touch screen to exercise telephony features in graphical user interface screen **201** such as initiating and finishing a call. In addition, keys **205**, **206** can be used to help the user navigate the user interface; for example, using END button **206** to go directly to the home screen or cancel some operation. IP Phone **101** also includes the following connectors distributed along side **213** for external devices: Universal Serial Bus (USB) **214**, headset **215**, microphone, **216**, Ethernet switched port for Personal Computer (PC) and Local Area Network (LAN), **217** and **218**, respectively, power supply **219**, RJ-11 (POTS) connector **220**, antenna **221** for support of wireless protocols such as, but not limited to, wireless fidelity (WI-FI) and Zigbee, RS-232 serial port **222**, and JTAG connector **223**.

IP phone **101** may further include an opening **207** for a phone speaker and a handset cradle **208** for corded or cordless handsets. IP phone **101** may further include a standard telephony keypad array **209** consisting of digits **0** to **9**, the star and pound keys. Below keypad **209**, IP phone **101** may include a circular key **210** used to activate and deactivate speakerphone **207**. At each side of speakerphone key **210**, two triangular keys **211**A-B may be used to increase (**211**B) and decrease (**211**A) the volume of the active audio output: handset, headset, speaker or ringer. Below speakerphone and volume keys **210**, **211**A-B, respectively, IP phone **101** includes an indicator **212** that turns on when speakerphone **207** is active and turns off when speakerphone **207** is inactive.

An embodiment of the hardware configuration of IP phone **101** is provided below in association with FIG. **27**. Referring to FIG. **27**, IP phone **101** may include a processor **2701** coupled to various other components by system bus **2713**. An operating system **2710** may run on processor **2701** and provide control and coordinate the functions of the various components of FIG. **27**. An application **2711** in accordance with the principles of the present invention may run in conjunction with operating system **2710** and provide algorithms, domain-specific knowledge and calls to operating system **2710** where the algorithms, domain-specific knowledge and calls implement the various functions or services to be performed by application **2711**. Application **2711** may include, for example, an application configured to perform a contextual search as discussed further below in association with FIG. **21**. Application **2711** may further include an application configured to perform a local caching of contextual search results as discussed further below in association with FIG. **22**. Application **2711** may further include an application configured to perform a one-touch call as discussed further below in association with FIG. **23**. Application **2711** may further include an application configured to order from a merchant using the no contact call service feature as discussed further below in association with FIG. **25**. Application **2711** may further include an application configured to vote on one or more issues on a ballot as discussed further below in association with FIG. **26**. Application **2711** may further include an application configured to host other domain-specific applications as discussed further below in association with FIG. **7**. Application **2711** may further include an application configured for a specific IP phone that can be retargeted to a new hardware platform and/or operating system as discussed further below in association with FIG. **8**. Application **2711** may further include an application configured for a specific IP phone that can be retargeted to a new communications infrastructure as discussed further below in association with FIG. **9**

Read only memory (ROM) **2702** may be coupled to system bus **2713** and could include a basic input/output system ("BIOS") that controls certain basic functions of IP phone **101**. Persistent memory ("FLASH") **2712** may be coupled to system bus **2713** and include the operating system **2710**, configuration data and user data. It is noted that local directories accessible through supported interfaces **1609** (discussed further below in association with FIG. **16**) may reside in FLASH **2712**. It is further noted that one or more applications **2711** may reside in FLASH **2712**, Random access memory (RAM) **2709** and disk adapter **2707** may also be coupled to system bus **2713**. It should be noted that software components including operating system **2710** and application **2711** may be loaded into RAM **2709** which may be IP phone's **101** main memory. Disk adapter **2707** may be an integrated drive electronics ("IDE") adapter that communicates with a disk unit **2708**, e.g., disk drive. It is noted that the applications mentioned above may reside in disk unit **2708**. It is further noted that local directory accessible via supported interfaces **1609** (discussed further below in association with FIG. **16**) may reside in disk unit **2708**.

Returning to FIG. **27**, in conjunction with FIG. **1**, communications adapter **2705** may also be coupled to system bus **2713**. Communications adapter **2705** may interconnect bus **2713** with an outside network **2704** enabling IP phone **101** to communicate with data network **102**, servers **106**, **107**, **108**, **109**, **110**, analog phones **113** via PSTN **105**, mobile phone **115** via mobile network **114**, etc.

Returning to FIG. **27**, in conjunction with FIG. **2**, other devices **2703** may be integrated into the system bus **2713** via miscellaneous input/output (I/O) ports **2706**.

Implementations of the invention include embodiments as a VoIP phone (IP phone) programmed to execute the method or methods described herein, and as a computer program product. According to the implementations, sets of instructions for executing the method or methods may be resident in the random access memory **2709** of one or more systems configured generally as described above. Until required by IP phone **101**, the set of instructions may be stored as a computer program product in another computer memory, for example, in disk unit **2708**. Furthermore, the computer program product may also be stored at another computer and transmitted when desired to the IP phone **101** by a network or by an outside network **2704** such as the Internet. One skilled in the art would appreciate that the physical storage of the sets of instructions physically changes the medium upon which it is stored so that the medium carries computer readable information. The change may be electrical, magnetic, chemical or some other physical change.

IP phone **101** includes a software platform with multiple layers adaptable to be used with different applications operating on IP phone **101** as well as adaptable to using different communication infrastructures. An embodiment of such a software platform is provided below in association with FIG. **3**.

Referring to FIG. **3**, platform **300** of IP phone **101** may include five layers. Layer **1** (hardware platform) **301** of platform **300** may include software to control the physical embodiment of IP phone **101**. The physical embodiment

includes, but is not limited to, Application-Specific Integrated Circuits (ASICs), processing elements, Input/Output (I/O) devices, peripherals, and storage elements.

Layer **2** (operating system services) **302** of platform **300** provides an interface to access operating system (OS) services and hardware platform devices. Layer **2 302** provides an execution environment for the software modules and a hardware abstraction layer. Among the responsibilities of layer **2 302** include implementing common OS services such as memory management, task management, date and time information, and access to peripherals; providing file system services to emulate hard disk drive on flash memory devices; providing a Transport Control Protocol/Internet Protocol (TCP/IP) networking API and the implementation of other required protocols such as Dynamic Host Configuration Protocol (DHCP), Trivial File Transfer Protocol (TFTP), Simple Network Time Protocol (SNTP) and Simple Network Management Protocol (SNMP); providing an embedded web server implementation that allows remote configuration through a web browser; implementing core graphics functionality for drawing, window management, event routing, fonts and bitmaps; and, implementing hardware drivers for each of the converged communication terminal's **101** peripherals.

Layer **3** (communications infrastructure services) **303** of platform **300** may be configured to interface with multiple communication infrastructures. Layer **3 303** of platform **300** contains a local services pool and a remote services pool, as illustrated in FIG. **4**. It is important to note that system **100** (FIG. **1**) contains a basic set of telephony features provided by a Common Converged Communication Base Services (CCCBS) layer **304**, as discussed below, which makes serverless communications straightforward as there is no reliance on the server/proxy for such features.

FIG. **4** illustrates an embodiment of the present invention of layer **3 303**. Referring to FIG. **4**, in conjunction with FIGS. **1** and **3**, layer **3 303** may include a remote services pool **401**. Remote services pool **401** refers to components that do not reside locally on IP phone **101**, but rather on telephony services **109** or PSTN **105** with which IP phone **101** may have to collaborate to provide extended communications features and converged voice/data/video services and/or interface with proprietary IP PBXs **107**, application servers **108** and PSTN elements such as centrex, call managers and softswitches. For every specific external collaborating entity, there might be an adapter module that implements all or part of the functionality exposed by a Communication Infrastructure Services (CIS) API **307**, as discussed below.

Layer **3 303** may further include a local services pool **402**. Local services pool **402** refers to components that reside on IP phone **101** and can provide an interface to communicate and collaborate with proprietary IP PBXs **107**, application servers **108** and PSTN **105** elements such as centrex, call managers and softswitches. While the vendor-specific interface implementation could reside locally or remotely on a network server or switch, the advantage of implementing this component on a network server or switch and leaving locally only a proxy to those services is that the need to create a new converged communications terminal **101** image for each change in an external component may be avoided. In addition, the gateway implementation may not be constrained by the (possibly) limited IP phone **101** resources.

Returning to FIG. **3**, platform **300** includes a layer **4** (common converged communications base services) **304**. Layer **4 304** includes communications (telephony) specific services as well as other data services commonly that may be required by domain-specific converged communication applications (referring to applications operating on IP phone **101**), as illustrated in FIG. **5**.

FIG. **5** illustrates an embodiment of the present invention of layer **4 304**. Referring to FIG. **5**, layer **4 304** includes telephony services **501**. Telephony services **501** include call processing functions that implement the core functionality to initiate, terminate and manage phone calls over VoIP and/or POTS communication infrastructures. Layer **4 304** may further include an implementation of signaling, media transport, voice processing and call control functionality. Among the responsibilities of these functions are: providing basic call control features; providing call setup and tear down functionality through protocols like Session Initiation Protocol (SIP), H.323, Media Gateway Control Protocol (MGCP) and others; providing media transport and signaling through protocols like Real-Time Protocol (RTP) and Real-Time Control Protocol (RTCP); providing voice processing features (echo cancellation, Voice Activity Detection (VAD), jitter buffering, etc); and notifying call-related events to the upper layer.

Layer **4 304** may further include other services **502**, such as data services. Services **502** may include Hyper-Text Transfer Protocol (HTTP) clients, Remote Procedure Call/Simple Object Access Protocol (RPC/SOAP), eXtensible Markup Language (XML) parser, directory services, configuration, Personal Computer/Personal Data Assistant (PC/PDA) synchronization, and user interface. HTTP client services provide a transport protocol to store and retrieve from server objects such as XML documents and images and play an important role in IP communications and application development, therefore enabling converged communications terminal **101** to participate in web-centric architectures. RPC/SOAP services, implement an interface to make remote procedure calls. Remote procedure calls allow IP phone **101** to send requests to and receive responses from components in the computer network. SOAP is an implementation of RPC that uses XML to format request/response information and HTTP to transport this information. Providing support for SOAP enables IP phone **101** to participate in web services. XML parser services translate data represented in XML format into internal data structures and requests for services. Structuring documents using XML allows sharing of information between different platforms and applications. In IP phone **101** there are at least three applications for XML: to describe the user interface layout and components, to make remote procedure calls and to format configuration files. Light-weight Directory Access Protocol (LDAP) provides an interface to access information in directory servers. Directory services are commonly used to carry out three main requirements of Internet Protocol (IP) telephony: authentication, personalization and white pages. Configuration services allow for the management of IP phone **101** settings such as: device ID, network, dial-plans, audio (codecs, Dual Tone Multi-Frequency (DTMF), voice processing), call control, SIP related parameters, volume, display, date/time, authentication, security, voice mail, phone book, ringer behavior, power management, language, peripherals, and software management. These services also implement routines for automatic retrieval of phone configuration and software upgrades from a server. PC and PDA communications services provide an interface to communicate and collaborate with external user devices such as the PC and PDA. IP phone **101** should collaborate closely with these devices to share information, keep that information synchronized, and accomplish tasks more effectively.

Returning to FIG. **3**, platform **300** includes a layer **5** (domain-specific applications) **305**. Layer **5 305** implements the

business logic and the presentation logic used to run applications operating on IP phone **101** as illustrated in FIG. **6**.

FIG. **6** illustrates an embodiment of the present invention of layer **5 305**. Referring to FIG. **6**, layer **5 305** includes business logic **601** that provides the mechanisms to combine the services provided by underlying modules into coherent applications that add some value to the end user. Some components of business logic **601** may run locally on IP phone **101** and some components will run remotely in an application server **108** (FIG. **1**). Some examples include extended calling features, phone directories, management and diagnostic tools, unified messaging, intelligent call management, instant messaging, contact management, personalized ring tones, call tracking, remote collaboration tools, and industry specific applications. It is at this layer that domain-specific differentiating features are implemented.

Layer **5 305** further includes presentation logic **602** that responds to the fact that the primary concerns of the User Interface (UI) module are the mechanisms of user interaction and how to lay out an appropriate presentation to the user in contrast with the primary concerns of business logic **601** are application domain policies and persistent storage interactions. The UI module may change according to customer's needs without changing the applications core functionality. For example, the same application domain modules with rich, web-based or text-based clients could be reused. Furthermore, the application module can be tested independently without resorting to awkward Graphical User Interface (GUI) scripting tools.

Layer **4 304** may be leveraged in the design of differentiated IP phones **101** via the following APIs. An operating system services API **306** provides common methods to access services provided by the operating system. For each specific operating system there is a module that supports the abstraction.

A Communication Infrastructure Services (CIS) API **307** provides common methods to access converged communication services available via the installed infrastructure. For each vendor-specific infrastructure there will be a module that will support the abstraction.

A Common Converged Communication Base Services (CCCBS) API **308** provides a standard method to access common converged communication services previously developed to satisfy a broad-range of converged communication domain-specific applications.

Platform **300** may be used to develop domain-specific applications (specific applications operating on IP phone **101**) for converged communication devices, to retarget one or more domain-specific applications developed for a specific IP phone **101** to a new hardware platform and/or operating system and/or communications infrastructure.

The method by which domain-specific applications for IP phones **101** may be rapidly developed based on the flexible software platform **300** previously described is presented schematically in FIG. **7**. FIG. **7** illustrates a method **700** for the development of domain-specific applications for converged communication terminals (IP phones **101**) based on software platform **300** (FIG. **3**) in accordance with an embodiment of the present invention.

Referring to FIG. **7**, in conjunction with FIGS. **1-3**, in step **701**, the requirement specifications for the application of interest are defined. In step **702**, the modules from common converged communications base services layer **304** to be incorporated into domain-specific application **305** is identified. Once these services are identified, these features are enabled in base services layer **304** in step **703**. In step **704**, a client interface is built so that the extra functionality developed for domain-specific application **305** can collaborate with the previously available base services layer **304**. In step **705**, any extra functionality that is not covered by base services **304** that is required for the domain-specific application of interest **305** is implemented. Method **700** leverages CCCBS API **308**.

It is noted that method **700** may include other and/or additional steps that, for clarity, are not depicted. It is further noted that method **700** may be-executed in a different order than presented and that the order presented in the discussion of FIG. **7** is illustrative. It is further noted that certain steps in method **700** may be executed in a substantially simultaneous manner.

The method by which one or more domain-specific applications developed for a specific IP phone **101** (FIGS. **1-3**) may be rapidly retargeted to a new hardware platform and/or operating system based on the flexible software platform **300** (FIG. **3**) previously described is presented schematically in FIG. **8**. FIG. **8** illustrates a method **800** by which one or more domain-specific applications developed for a specific IP phone **101** may be rapidly retargeted to a new hardware platform and/or operating system based on the flexible software platform **300** in accordance with an embodiment of the present invention.

Referring to FIG. **8**, in conjunction with FIGS. **1-3**, in step **801**, the differences between constructs of the original and the new operating systems are identified. Further, any new hardware drivers that would be needed are identified. Once these have been identified, an operating system services layer adapter module is built as part of API **306** for the new operating system and the implementation of the new hardware drivers in step **802**. Method **800** leverages the operating system services API **306**.

It is noted that method **800** may include other and/or additional steps that, for clarity, are not depicted. It is further noted that method **800** may be executed in a different order than presented and that the order presented in the discussion of FIG. **8** is illustrative. It is further noted that certain steps in method **800** may be executed in a substantially simultaneous manner.

The method by which one or more domain-specific applications developed for a specific IP phone **101** (FIGS. **1-3**) may be rapidly retargeted to a new communications infrastructure based on the flexible software platform **300** (FIG. **3**) previously described is presented schematically in FIG. **9**. FIG. **9** illustrates a method **900** by which one or more domain-specific applications developed for a specific IP phone **101** may be rapidly retargeted to a new communications infrastructure based on the flexible software platform **300** in accordance with an embodiment of the present invention.

Referring to FIG. **9**, in conjunction with FIGS. **1-3**, in step **901**, an adapter module for the new communications infrastructure services layer **303** on which IP phone **101** will be deployed is built. In step **902**, communications infrastructure services layer **303** is configured to accept the new module and to have it collaborate with pre-existing modules. Method **900** leverages operating system services API **306** and communications infrastructure services API **307**.

It is noted that method **900** may include other and/or additional steps that, for clarity, are not depicted. It is further noted that method **900** may be executed in a different order than presented and that the order presented in the discussion of FIG. **9** is illustrative. It is further noted that certain steps in method **900** may be executed in a substantially simultaneous manner.

An embodiment of a client-server communications architecture for which software platform **300** (FIG. **3**) and methods

described above can be used to develop client converged communication terminal devices **101** that can support the distribution of value-added services to end-users is illustrated in FIG. **10**. FIG. **10** illustrates an embodiment of the present invention of a client-services communications architecture **1000** for which software platform **300** and methods described above can be used to develop client converged communication terminal devices **101** that can support the distribution of value-added services to end-users.

Referring to FIG. **10**, client-services communications architecture **1000** forms the basis of a Transactional Application Delivery System (TADS) for service providers and/or third party developers and content providers to rapidly develop, deliver, and manage revenue generating and productivity enhancing data-voice applications for IP phones **101**. Data-voice applications are those that take advantage of voice over Internet Protocol (VoIP) and/or POTS/Broadband infrastructures.

As illustrated in FIG. **10**, TADS server side elements **1001** communicate with TADS client side elements **1002**, e.g., IP phones **101**, via data network **102**, e.g., Internet. Client-services communications architecture **1000** has built-in flexibility allowing it to evolve with advancements in hardware, software, protocols, thus providing an extensive platform for delivery of applications and content. The following are among the main characteristics of software platform **300** (client-services communications architecture **1000**).

TADS **1000** provides an integrated download and content management system which enables the delivery of software and content to enabled devices. This download manager supports the entire process of software provisioning, including the submission of content and applications from third-party developers, testing and certification of those applications, bundling, pricing, demographics-based targeted promotions, and delivery to enabled terminals.

TADS **1000** further includes the capability to remotely, provision, configure, or upgrade compatible devices. This enables providing online help support to users and reducing the need for on premise visits. Through this capability, service providers are able to bring up new clients, push the latest software updates to the terminals, or remotely perform a move, add, or change to a customer's system.

TADS servers **1001** may process all voice and data before transmitting to the device. TADS servers **1001** communicate with TADS client side elements **1002** to determine the optimal delivery, compression, and formatting of the information to be displayed on IP phone **101**. This content optimization will maximize the service providers use of available device resources ate at the customer's premise.

TADS **1000** further includes the capability of using open standard interfaces to enable quick and easy integration with a carrier's existing systems and third party equipment and software.

Furthermore, all software components of TADS **1000** incorporate redundancy and load balancing to provide a very high level of service availability. To enable carrier grade reliability, TADS servers **1001** route all voice and data traffic to other servers should it encounter any hardware or software failures. TADS **1000** provides scalability simply through the addition of servers. A more detailed description of TADS **1000** is provided below in association with FIG. **11**.

FIG. **11** illustrates an embodiment of the present invention of the server and client sides of TADS **1000**. Referring to FIG. **11**, TADS **1000** includes a server side **1001** (FIG. **10**) and a client side **1002** (FIG. **10**). It is noted that TADS server **1001** refers to server **108** (FIG. **1**) and that TADS client side elements **1002** refer to IP phone **101** (FIGS. **1-3**).

TADS server side elements **1001** include a front-end console **1101** that allows merchants to submit to a content distribution platform **1204** (FIG. **12** which will be discussed below), via a web-based interface (not shown), multi-media advertising content, define the demographic characteristics of the target audience, schedule the dates and times when advertisements from third parties should be distributed, and pay for the service. A third-party may develop an alternate front-end console **1119** that may extend upon front-end console **1101**.

TADS server side elements **1001** further include a TADS server protocol engine **1102** that handles all communications using the TADS protocol on the server side for handling transactions, distributing advertisements, subscribing clients to distribution groups and delivering products to clients.

TADS server side elements **1001** further include various server software modules and databases (discussed below) on top of which telephony applications and converged voice-data applications and services may be constructed. TADS server side elements **1001** further include a settlement manager **1302** (FIG. **13** which will be discussed below) that maintains a log of all end-user actions during a converged communications session that can then be used to determine profit allocation throughout the value chain (merchants, content providers, service providers, and the owner of the content distribution platform) as well as to obtain valuable closed activity reports that may be used to drive new services and log valuable demographic data on all end-user transactions.

Referring to FIG. **11**, TADS front-end (console) **1101** may be configured to be a front-end to the Transactional Applications Delivery System (TADS) programmatic API **1103**. TADS front-end (console) **1101** presents a selective view of all the data accessible to programmatic API **1103**. This includes custom graphical user interfaces, web-based interfaces, command line interfaces, and others. Customized front-ends can be developed by third-parties also.

TADS programmatic APIs **1103** expose all aspects of the TADS framework to calling applications. This includes browsing (read, write, delete, add) information on consumers, vendors, billing, channel definitions, transactions, content and distribution groups.

TADS server side elements **1001** further include a vendor management module **1104** configured to allow access to a vendor database **1105**. Vendor management module **1104** may be an adapter to communicate with an existing system or internal vendor database **1105**. All the information regarding vendors is stored and accessed through vendor management module **1104**. Vendor management module **1104** can be used by a content programming module **1106** to get vendor information. Vendors are clients of the service provider. They buy advertisement space/time on IP phone **101** and get orders from customers through IP phone **101**.

TADS server side elements **1001** further include a demographics module **1107** configured to access a consumer database **1108** and apply rules to query records that show specific demographic characteristics. Demographics module **1107** may further include an adapter to communicate with an existing system or an internal consumer database **1108**.

TADS server side elements **1001** further include a user management module **1109**. Users of TADS-enabled clients may be regarded as consumers by the vendors using TADS. Users can be added, changed or deleted through the use of user management module **1109**. All information regarding users is accessed through user management module **1109**.

TADS server side elements **1001** further include content programming module **1106**, as mentioned above. Content programming module **1106** is involved in defining the distribution and exposition of advertisements throughout the net-

work of TADS-enabled clients, e.g., IP phone **101**. Advertisements are exposed at the remote clients by the transactional applications distributed by TADS server **1001**. Vendors can use the graphical user interface exposed by TADS front-end **1101** to access content programming module **1106**. Content programming module **1106** may be used to create distribution groups for advertisements and to schedule showing time among the clients in the group. Vendors can define distribution and level of exposure for an advertisement using criteria such as user demographics, geographical or organizational boundaries and buying history. The resulting scheduling information is stored in a distribution group schedule database **1110**.

TADS server side elements **1001** further include a transaction engine **1111**. Transaction engine **1111** is an engine that autonomously handles transactions from TADS client side elements **1002**. Transaction engine **1111** may be configured to keep records of all transactions handled. Transaction engine **1111** may also access a billing database **1112** (or an external billing system). Transaction engine **1111** can also change consumer database **1108** to reflect particular information about consumer buying behavior in consumer database **1108**. Transactions are started by TADS client side elements **1002**. A transaction starts with a consumer selecting an advertisement on TADS client side elements **1002**. Client and server exchange purchase order details and after the order is confirmed the product is delivered (when appropriate) over network **102**. A transaction ends when the product is delivered to the TADS-enabled device, e.g., IP phone **101**.

TADS server side elements **1001** further include TADS server protocol engine **1102**, as mentioned above. TADS server protocol engine **1102** may be configured to handle all communications using the TADS protocol on the server side. The TADS communication protocol is used for handling transactions, distributing advertisements, subscribing clients to distribution groups and delivering products to TADS client side elements **1002**.

TADS server side elements **1001** further include a Transactional Applications (TA) distribution engine **1113**. TA distribution engine **1113** may be used to distribute Transactional Applications (TA) to TADS client side elements **1002**, e.g., IP phones **101**. TA distribution engine **1113** may be configured to look up the scheduling database for TAs to distribute and to use TADS protocol engine **1102** to send them to the appropriate destinations. Destinations are defined as groups of TADS client side elements **1002** that have been identified as having the appropriate channels to handle the TA to be sent. Transactional applications are chartered with the task of advertising a product and completing a sell transaction from a network of TADS client side elements **1002**.

TADS server side elements **1001** further include a group subscription manager module **1114** configured to handle the subscription and un-subscription of TADS client side elements **1002** for each distribution group. A distribution group contains an identifier for each of TADS client side elements **1002** that are members of the group. Subscription can take place at client registration time or it can be initiated by the server whenever a TA is scheduled for distribution. The subscription process delivers scheduling information for a TA to TADS client side elements **1002**.

TADS server side elements **1001** further include a product delivery engine **1115** configured to assist transaction engine **1111** to complete a sale by delivering a product purchased to TADS client side elements **1002** whenever possible.

TADS server side elements **1001** further include a billing manager module **1116** used to access billing information. Billing manager module **1116** may include an adapter to communicate with an external billing system or internal billing database **1112**.

Billing database **1112** may contain information on sales done on behalf of vendors through TADS and TA distribution charges. Vendors are billed by service providers for their use of TADS.

Other databases in TADS server side elements **1001** include a transaction database **1117** configured to contain records of all transactions enabled by TADS.

Another database in TADS server side elements **1001** is vendor database **1105**, as mentioned above. Vendor database **1105** contains vendor information.

Another database in TADS server side elements **1001** is consumer database **1108**, as mentioned above. Consumer database **1108** contains all information related to consumers. Consumers are the users of TADS client side elements **1002**.

Another database in TADS server side elements **1001** is distribution group schedule database **1110**, as mentioned above. Distribution group schedule database **1110** contains information on what devices should get what TAs and at what times they should be shown.

Another database in TADS server side elements **1001** is a content database **1118**. Content database **1118** contains products and TAs to be delivered by TADS server **1001**.

Referring to FIG. **11**, elements of TADS client **1002** include a TA programming manager module **1120** configured to receive subscription requests from servers through a TADS client Protocol Engine **1121**. TA programming manager module **1120** may be configured to keep track of what TAs are expected through each channel at specific times and where in the phone user interface they should be rendered.

TADS Client Protocol Engine **1121** may be configured to handle all communications using the TADS protocol in each client. The TADS communication protocol is used for handling transactions, distributing advertisements, subscribing clients to distribution groups and delivering products to client side elements **1002**.

Client side elements **1002** may further include a TA execution engine **1122** configured to execute a TA at the client, e.g., IP phone **101**. The TA uses a transaction broker module **1123** to engage in transactions with TADS server **1001**. TA execution engine **1122** also renders advertisements on the user interface of the TADS client side elements **1002**, e.g., IP phone **101**.

Client side elements **1002** may further include a UI event handler **1124**. UI event handler **1124** is not provided by the TADS framework. It is part of the infrastructure of TADS client side elements **1002**. UI event handler **1124** gets events from the UI of TADS client side elements **1002**, e.g., IP phone **101**, and forwards them to transaction broker module **1123** and TA execution engine **1122**.

Transaction broker module **1123** interacts with transaction engine **1122** at TADS server **1001** through TADS client protocol engine **1121**. Transaction broker module **1123** helps TAs to complete transactions.

Client side elements **1002** may further include a product installer module **1125** configured to install products in database **1126** delivered through the TADS framework.

Client side elements **1002** may further include a product downloader module **1127** which interacts with the product delivery engine at TADS server **1001** through TADS client protocol engine **1121**. Product downloader module **1127** downloads products purchased through TADS.

Client side elements **1002** may further include a group and channel bindings database **1128** which contains information

on what TAs will be delivered through each distribution group and when and where in the UI their advertisements will show up.

Installed applications database **1126**, as mentioned above, will hold all applications installed through TADS.

It is noted that the embodiment of the server and client sides of TADS **1000** may include other and/or additional modules that for clarity are not depicted. It is further noted that TADS **1000** may be implemented with a different combination of modules and that those presented in the discussion of FIG. **11** are illustrative.

An embodiment of the present invention related to the development of a series of end-to-end services and methods that enable directory search and advertising service delivery to IP phones **101** via a content distribution platform that allows consumers, businesses, content owners, and service providers to leverage the benefits of converged data-voice applications based on the TADS building blocks discussed above and software platform **300** (FIG. **3**) is discussed below in association with FIG. **12**.

FIG. **12** illustrates an embodiment of the present invention of a converged communications content distribution architecture **1200** with end-to-end services that enable directory search and advertising service delivery to IP phones **101**. Referring to FIG. **12**, merchants **1201** engage directly, via a web-based interface, with the content distribution platform owners **1204** to schedule, target, and provide multimedia content for what is referred to herein as the "premium listing services" (described in more detail further below). Among the services supported by the present innovation are "web search engine-like" search capability on the terminal (IP phone **101**), user-aware "yellow pages" applications on the terminal (IP phone **101**), one-touch call initiation, no-contact transactions, ability to save query results on the terminal (IP phone **101**), delivery of multimedia advertisements to IP phones **101**, and priority listings of merchant information based on contextual data supplied by merchant **1201**.

Referring to FIG. **12**, FIG. **12** further illustrates that converged communications content distribution architecture **1200** enables the distribution of merchant directory (contact) information and advertising content to end-user terminals (IP phones **101**) supported by a service provider's converged communications infrastructure **1205** (VoIP and/or POTS/Broadband). Content may be provided directly by existing content owners **1202** or by the merchant's themselves via network **102**. The architecture identifies five major stakeholders: the merchants **1201** that want to make their services and products available to end-users **1203**, established content owners **1202** that possess basic contact information on merchants **1201**, converged communication service providers that provide the communications infrastructure used to physically exchange information between merchants **1201** and end-users **1203**, and owners **1202** of the content distribution end-to-end channel.

FIG. **13** illustrates an embodiment of the present invention of TADS server side elements **1001** that further clarify the elements of TADS server side elements **1001** depicted in FIG. **10**. Referring to FIG. **13**, in conjunction with FIGS. **10** and **11**, TADS server side elements **1001** include front-end console **1101** that allows merchants to submit to the content distribution platform, via a web-based interface, multi-media advertising content, define the demographic characteristics of the target audience, schedule the dates and times when the ads should be distributed, and pay for the service. TADS server side elements **1001** further include a TADS server protocol engine **1102** that handles all communications using the TADS protocol on the server side for handling transactions, distributing advertisements, subscribing clients **1002** to distribution groups and delivering products to clients **1002**. TADS server side elements **1001** further include various server software modules and databases **1301** on top of which telephony applications **1303** and converged voice-data applications and services **1304** may be constructed. TADS server side elements **1001** may further include a settlement manager **1302** that maintains a log of all end-user actions during a converged communications session that can then be used to determine profit allocation throughout the value chain (merchants, content providers, service providers, and the owner of the content distribution platform) as well as to obtain valuable closed activity reports that may be used to develop new services and log valuable demographic data on all end-user transactions.

FIG. **14** illustrates an embodiment of the present invention of TADS client side elements **1002** that further clarify the elements of TADS client side elements **1002** depicted in FIG. **10**. Referring to FIG. **14**, in conjunction with FIGS. **10-11**, TADS client side elements **1002** include TADS client protocol engine **1121** and various client software modules and databases **1401**. Client protocol engine **1121** handles all communications using the TADS protocol in each client. The TADS communication protocol is used for handling transactions, distributing advertisements, subscribing client side elements **1002** to distribution groups and delivering products to client side elements **1002**.

FIG. **15** is an embodiment of the present invention of a telephony services architecture using software platform **300** (FIG. **3**) in IP phone **101** (FIGS. **1-3** and **27**). Referring to FIG. **15**, in conjunction with FIGS. **1-3**, telephony services architecture **1500** allows for flexible implementation of extended telephony features independent of the back-end infrastructure and signaling protocol. It also hides from the application changes in the underlying operating system and hardware platform. Adding new telephony features entails changes in three main areas: extending the call control model and state machine, implementing the message exchange (call flow) in a particular signaling protocol (e.g., Session Initiation Protocol (SIP) or H323), and decoding proprietary extensions to the signaling protocol (e.g., non-standard SIP headers).

CCCBS API **308** provides a uniform telephony interface to an application, e.g., telephony application I **1501**A, telephony application II **1501**B, in domain-specific applications layer **305**. Applications **1501**A, **1501**B request telephony services (make a call, receive a call, disconnect a call, hold, transfer, forward, redial, reject, activate speaker phone) and receive confirmation events specifying if the action was completed successfully or some failure occurred. CCCBS API **308** also notifies the application of events originated at the remote end (e.g., call was dropped).

CCCBS layer **304** implements telephony high-level abstractions (call, address, terminal, provider, connections) and the call control state machine. The generic call control block **1502** provides basic features expected from a regular phone such as make call, receive call, hold, transfer, 3-way conference, call waiting, redial, do not disturb, caller id, and predialing. Many other extended features such as forward, find-me, call park/pickup, click-to-dial, automatic redial, and call screening could be required depending on the deployment environment or customer's needs. Even though the main logic of many of these features is implemented at the IP PBX **107** or a specific telephony services server **109**, such as a SIP Server, client **1002** still needs to extend its baseline state machine (discussed below) to participate and support these features. Customization at this level may require implementing features that only specific vendors provide and selecting

the precise feature combination that a customer needs. This is shown in vendor specific call control blocks **1503**A-B.

CIS API **307** provides a protocol and vendor independent interface that will isolate CCCBS layer **304** from changes in the signaling protocol used to implement supported telephony services and how the protocol is used to implement a particular feature. For example, one may use either SIP or H323 as the underlying signaling protocol depending on the telephony infrastructure where IP phone **101** will be deployed. In addition, the same standard feature, call forward for example, can be implemented with a different combination of protocol messages. Since SIP is a general protocol for the establishment and management of multimedia sessions and not specific to telephony (that is, establishing telephony sessions is one of its uses), one may combine SIP messages in different ways to implement the same telephony features. IP phone **101** may need to adapt the implementation of a given feature with a given protocol to comply with the specifications of IP PBX **107** or a specific telephony services server **109**, such as a SIP server, of the environment in which IP phone **101** will participate. Sometimes, even with standard messages such as SIP REGISTER, vendors may require specific headers in order to interoperate. The CIS layer **303** may include vendor-specific telephony adapters **1504**, **1507**, a generic SIP telephony adapter **1505**, and a generic H.323 telephony adapter **1506**. It is noted that CIS layer **303** may include other adapters and that FIG. **15** is illustrative.

The native SIP/H323 protocol stack **1508**, a part of CIS layer **303**, provides portable protocol implementation between different operating systems and uses standard TCP/IP and standard network programming APIs to communicate with operating system services layer **302** which includes a TCP/IP protocol stack **1509** and controls platform drivers and hardware **1510**.

FIG. **16** illustrates an embodiment of the present invention of a directory services architecture **1600** using software platform **300** (FIG. **3**) in IP phone **101** (FIGS. **1-3** and **27**). Referring to FIG. **16**, in conjunction with FIGS. **1-3**, directory services architecture **1600** allows an application operating on IP phone **101** to access information such as contacts and call logs in a consistent manner regardless of where the information is physically stored or managed. Architecture **1600** hides from the application changes in the location of the information, the protocol used to access the information and in the underlying OS and hardware platform.

CCCBS API **308** provides a uniform interface to an application **1601** to access call history information, phone addresses and contact information in general. This information can be stored locally in IP phone **101** or in a remote server.

CCCBS layer **304** is divided in two sub layers **1602**, **1603**. Sub layer **1603** implements the specific information exchange protocol and the other formats the data appropriately for application **1601** through CCCBS API **308** and transforms the application requests and data appropriately for its final repository.

If the information is stored locally, then a local data adapter **1604** in sub layer **1602** needs to read the file, decode it (XML, binary fixed size records) and present it to application layer **305**. If the information is stored remotely, then a protocol is needed to exchange information between IP phone **101** and the remote repository. Sub layer **1602** includes the interfaces to access operating system services layer **302**. For example, local data adapter **1604** may access call logs interface **1608** and phonebook interfaces **1609** to make available locally stored information to the application code **305** via the CCBS APIs **308**.

LDAP is standard protocol for providing client-server access to directory services. Directory services are commonly used in IP telephony to carry out authentication, personalization and contact searching. A portable LDAP client can be implemented on IP phone **101** or exchange directory information in XML format with an external LDAP client that makes the actual connection to the repository. An LDAP adapter **1605** in sub layer **1602** uses the LDAP client to fulfill application requests and presents the information to the application. LDAP adapter **1605** interfaces with operating system services layer **302** via an LDAP client interface **1610**.

An XML-RPC adapter **1606** in sub layer **1602** and interface **1610** in sub layer **1603** allow IP phone **101** to send and receive requests from a remote server in XML format. In particular, SOAP is an XML-RPC language that uses HTTP as a transport protocol and will provide IP phone **101** with the foundation to communicate with servers exposing information through web services.

Other adapters **1607** in sub layer **1602** can be included as necessary to interoperate with other sources of contact information. For example, third party IP PBXs, centrex, call mangers and softswitches can provide personal directories and call logs so that IP phone **101** does not need to use storage space locally but may use proprietary protocol to exchange the information. IP phone **101** may also want to access/synchronize contacts with devices, e.g., Pocket PC, or third party contact management software. Other adapters **1607** interface with operating system services layer **302** via other interfaces **1612**.

Another important part of base services layer **304** provided by platform **300** are the Transactional Applications Delivery System (TADS) services discussed above. As stated above, the TADS is a networked system that distributes Transactional Applications (TAs) to remote VoIP agents based on user profiles associated with the agents. A TA is a relatively small hosted application that enables the user of the VoIP agent (a consumer) to complete commercial transactions with one or more vendors. The TADS also gathers TA usage information to build user profiles that enable vendors to target TAs to their customers. TADS services are coordinated through a network server maintained by the TADS service provider.

Referring to FIG. **16**, in conjunction with FIGS. **1-3**, operating system services layer **302** includes Real Time Operating System (RTOS) services **1613** used to interface with the low-level memory, I/O and control resources of the platform hardware **301** (hardware of IP phone **101**).

FIG. **17** illustrates an embodiment of the present invention of a transactional application delivery system services architecture **1700**. Referring to FIG. **17**, in conjunction with FIGS. **1-3**, **10** and **11**, FIG. **17** further illustrates an embodiment of the present invention of how TAs in layer **5** (Domain-specific Applications) **305** are supported by software modules in layer **4** (CCCBS) **304** of software platform **300** in IP phone **101**. Please find presented three examples of domain-specific hosted applications as examples, namely: preferred search **1701**, local search **1702** and sponsored programming **1703**. Preferred search **1701** is a series of configurable and extensible shortcuts to information on commercial services and products made available to the user by the TADS service provider. Local search application **1702** allows the consumer to browse through products and services offered by vendors local to a specific geographical region. Sponsored programming application **1703** feature advertisements selected based on usage statistics, consumer demographics and other consumer information. All three types of applications **1701-1703** can generate transactions, voice calls and other events that can be used to augment user profiles

A TADS protocol stack **1704** in CCCBS layer **304** implements the communication protocols needed to distribute TAs, carry out transactions, and gather TA events. A TADS transaction manager **1705** in CCCBS layer **304** uses TADS protocol stack **1704** to carry out transactions with another transaction manager at TADS server **1001**. A TADS programming manager **1706** in CCCBS layer **304** receives and manages programming information from TADS server **1001** to schedule sponsored programming and other advertisements. Application Hosting Services (AHS) **1707** provide the environment needed by third-party applications in layer **5 305** to run. A Secure Sockets Layer (SSL) module **1708** in CCCBS layer **304** provides secure transport of information between nodes of the network.

TADS client side elements **1002** services can be shared by applications targeted for a broad range of domains, therefore reusing the code that provides the services and effectively shortening the development cycle of domain-specific applications.

Application delivery system services architecture **1700** may further include RTOS services **1709** in operating system services layer **302** which is interfaced with platform drivers and hardware **1710**.

FIG. **18** illustrates an embodiment of the present invention of an application hosting services ("AHS") architecture **1800** using software platform **300** (FIG. **3**) in IP phone **101** (FIGS. **1-3** and **27**). AHS architecture **1800** may be used to facilitate the management of third-party applications operating on platform **300** (FIG. **3**) of IP phone **101** (FIGS. **1-2** and **27**). This includes, but is not limited to: searching for suitable applications on the web, downloading host-able applications to the target, loading and running applications on the target, security and protection mechanisms to protect other code and data on the target from malicious applications, and access methods to input/output resources of the IP phone **101**.

Symbolic reference checker **1805** provides security against malicious programs by making sure only the appropriate symbols are referenced from the hosted applications. This utility is used before the application is loaded into the target's memory. Another security mechanism is to have the applications run in a special mode where only some of the services offered by platform **300** are accessible. Hosted application exception handlers **1815** can protect the stability of the load by filtering exceptions based on the task that generates them, only penalizing the offending hosted application and not the whole load. Referring to FIG. **18**, disk and memory quotas and other resource usage policies may be enforced by the hosted application resource management modules **1801**, layout manager **1813**, task priority manager **1802**, memory manager **1803** and disk space manager **1804**.

Update engine **1810** provides application search services that allow the IP Phone **101** to find an appropriate hosted application, or an update to an already hosted application, on another computer system through the use of a network **2704** (FIG. **27**). Downloader/installer **1811** provides the services required to transfer hospitality applications from other computer systems to the persistent storage (FLASH) **2712** or disk init **2708** of the IP Phone **101**. Loading & execution control **1812** implements the services required to load hosted application to RAM memory **2714** and to execute or halt such applications.

Hosted application A **1806**, hosted application B **1807** and hosted application C **1808** are example hosted applications. There could be several hosted applications running at the same time on the IP phone **101** or waiting to be run. A hosted applications manager **1809** is an example hosted application used to organize and control other hosted applications **1806**, **1807**, **1808**. Application Hosting Services (AHS) application programming interfaces (APIs) **1814** provide all the resources and services the hosted applications **1806**, **1807**, **1808** and **1809** use. Applications targeted for a broad range of domains can share these APIs, therefore reusing the code beneath and effectively making the development cycle shorter.

FIG. **19** illustrates an embodiment of the present invention of directory search and advertising services **1900**. Referring to FIG. **19**, directory search and advertising services **1900** constitute an example class of TADS-enabled applications and services that can be built on top of the TADS server side and client side software modules and databases. The services may be categorized according to baseline directory services **1901**, premium listing services **1902**, and advertising services **1903**. A description of the services that can be offered under each category and how these are supported by converged communications content distribution platform owner **1204** (FIG. **12**) are described below.

FIG. **20** illustrates monetizing baseline directory services **1901** (FIG. **19**), premium listing services **1902** (FIG. **19**) and advertising services **1903** (FIG. **19**) in accordance with an embodiment of the present invention.

Referring to FIGS. **19** and **20**, in conjunction with FIGS. **1-3**, **11**, **12** and **13**, baseline directory services **1901** are constructed from existing baseline subscriber merchant **2005** directory (contact information) content databases **2003** provided by content owners **2002**. Baseline directory services **1901** include all end-point views of said information displayed on the end-user terminals (IP phone **101**) and the end-user actions that can be performed on the information. These services include, but are not limited to, directory queries, query results local save, and one-touch communications.

Directory query involves the end-user invoking the local search application on the converged communications terminal (IP phone **101**) and entering the required search information (e.g., merchant category and desired location). The end-user query is handled by the client protocol engine **1121** and securely submitted to TADS server protocol engine **1102**. Server returns query results to the end-user terminal **101**, providing baseline information (including information such as merchant name, address, phone numbers, and maps) and premium listing services (see below) for all merchants that match the query specifications. Settlement manager **1302** logs all actions associated with the served transaction including, for example, the merchants actually viewed by the end-user, the merchants for which the end-user requested more information, the merchants that were actually contacted by the end-user, and the merchants for which the end-user responded to premium listing actions. Note that this close-looped environment allows the content distribution platform owner to use contextual information beyond the query search terms provided by the end-user, such as the location of the IP Phone (residence, hotel, condominium), past end-user usage patterns (preferences), and demographics to provide higher quality search results.

Query results local save involves the end-user selecting one of baseline or premium listings **1901**, **1902**, respectively, returned by a directory query and save the associated content information into a local entry in their converged communications terminal (IP phone **101**) address book. Settlement Manager **1302** logs the transaction.

One-touch communications involves the end-user selecting one of baseline **1901** or premiums **1902** listings returned by a directory query and initiates a call via the converged

communications infrastructure by simply selecting the "one-touch" call feature. Settlement manager **1302** logs the transaction.

Premium listing services **1902** are constructed from existing merchant directory (contact information) content databases provided by the content owners and additional information provided directly by the merchants via the web-based TADS front-end console **1101** that feeds into the converged communications content distribution platform owner **1204**. Premium listing services **1902** include, but are not limited to, top billing (priority placement) of a merchant's contact information in results provided in response to an end-user query (including multimedia content) and no-contact transactions (allows end-user to complete a transaction with the merchant without the need to generate a voice call).

Top billing (priority placement) service involves merchants using TADS front-end console **1101** to subscribe to this premium listing service. Merchants provide the converged communications content distribution platform **1204** (FIG. **12**) with contextual information required for the platform to provide merchant priority placement in the presentation of query results to end-users. The contextual information takes the form of both keyword information associated with the merchant's services and end-user demographic information that the merchant may want included in the determination of whether or not top-billing should be provided to its listing. Settlement manager **1302** logs all aspects of the transaction.

Multimedia listing services involves merchants using TADS front-end console **1101** to subscribe to this premium listing service. Merchants provide the converged communications content distribution platform **1204** with contextual information required for the platform to provide merchant priority placement in the presentation of query results to end-users as for the top billing service and provide additional multimedia material to be used in accordance to the type of multimedia listing selected by the merchant. For example, the merchant may opt for half-screen or quarter-screen images to be used in presenting its listing and for specific multimedia presentations to be presented to the end-user if the merchant's listing is selected by the end-user. Settlement manager **1302** logs all aspects of the transaction.

No contact call services involve merchants using TADS front-end console **1101** to enable no contact call service functionality for its premium listings. If an end-user selects a listing with no-contact call service functionality, the TADS server **1001** manages the request by prompting the end-user to provide, via the converged communication terminals (IP phone **101**) input interface, to provide all required information to complete a transaction according to the vendor requirements. Information is then transferred to the merchant without further end-user intervention (e.g., via e-mail or synthesized voice message). Upon receipt of the request the merchant takes the appropriate action. For example, a premium pizzeria's listing could prompt the user to select amongst a variety of offers. The user would provide the required information pertaining to the offers (for example, pizza size, toppings, crust, etc.) and the converged communications content distribution platform owner **1204** would relay the information to the merchant. There would be no need for the end-user to provide address, phone number, and payment information since all of this information would already be available to the converged communications content distribution platform owner **1204** through its relationship with the converged communications infrastructure service provider **2007** and content distribution platform owner **1204**. Settlement manager **1302** logs all aspects of the transaction.

Advertising services **1903** are constructed from existing merchant directory (contact information) content databases **2003** provided by the content owners **2002** and additional information provided directly by the premium subscriber merchants **2006** via the web-based TADS front-end console **1101** that feeds into the converged communications content distribution platform owner **1204**. Merchants **1201** may define distribution and level of exposure for an advertisement using criteria such as user demographics, geographical or organizational boundaries and buying history. Advertising services include, but are not limited to, the distribution of wall-paper (digital image rendered on the converged communications terminal's display) and video advertisements that can be displayed on the end-user terminal (IP phone **101**) based on specific criteria, including demographics-based algorithms. In all cases the advertisements would retain a portion of end-user's **1203** terminal display. End-user **1203** would have the option of receiving more information on the advertising service or product by simply selecting it via the terminal's input interface. These advertisements would be scheduled and targeted according to the merchant's instructions. Settlement manager **1302** logs all aspects of the transaction.

FIG. **21** is a flowchart of a method **2100** for performing contextual searches, as discussed above, in accordance with an embodiment of the present invention. Referring to FIG. **21**, in conjunction with FIGS. **1-3**, **11**, **13**, **17** and **19**, in step **2101**, IP phone **101** receives a command to perform a contextual search as well as the search query from the end-user. IP phone **101** receives such a command in response to the end-user invoking local search application **1702** on the converged communications terminal (IP phone **101**) and entering the required search information (e.g., merchant category and desired location). In step **2102**, the end-user query is handled by client protocol engine **1121** and securely submitted to TADS application server **108**. It is implied that a remote application server **108** will receive the criteria for the contextual search, produce results based on them and send the results back to the IP phone **101** using a TADS server protocol engine **1102**. In step **2103**, IP phone **101** receives the query results from application server **108** where the query results provide baseline directory services **1901** (including information such as merchant name, address, phone numbers, and maps) and premium listing services **1902** for all merchants that match the query specifications. In step **2104**, settlement manager **1304** logs all actions associated with the served transaction including, for example, the merchants actually viewed by the end-user, the merchants for which the end-user requested more information, the merchants that were actually contacted by the end-user, and the merchants for which the end-user responded to premium listing actions. In step **2105**, the end-user selects either baseline or premium services **1901**, **1902**, respectively, for the merchant of interest and proceeds according to the nature of the listing.

It is noted that method **2100** may include other and/or additional steps that, for clarity, are not depicted. It is further noted that method **2100** may be executed in a different order than presented and that the order presented in the discussion of FIG. **21** is illustrative. It is further noted that certain steps in method **2100** may be executed in a substantially simultaneous manner.

FIG. **22** is a flowchart of a method **2200** for performing a local save, as discussed above, in accordance with an embodiment of the present invention. Referring to FIG. **22**, in conjunction with FIGS. **1-3**, **11**, **13** and **16**, in step **2201**, the end-user selects a query result. In step **2202**, the content information associated with the query result is stored as a

local entry in IP phone's **101** phonebook interface **1609**. In step **2203**, settlement manager **1302** logs all actions associated with the served transaction. For example, the end-user searches for a service establishment by providing information such as the type of service establishment and the location and submitting the query to phonebook interface **1609**. The server processes the query and returns various options to the end-user. For each option, the merchant's name and relevant contact information is provided, as is the option to save the merchant's information into the end-users' IP phone local directory. The end-user, by selecting the local save option for a merchant of interest, will save the merchant's contact information into the IP phone's local (on-phone) phonebook interface **1609**.

It is noted that method **2200** may include other and/or additional steps that, for clarity, are not depicted. It is further noted that method **2200** may be executed in a different order than presented and that the order presented in the discussion of FIG. **22** is illustrative. It is further noted that certain steps in method **2200** may be executed in a substantially simultaneous manner.

FIG. **23** is a flowchart of a method **2300** for performing one-touch calls, as discussed above, in accordance with an embodiment of the present invention. Referring to FIG. **23**, in conjunction with FIGS. **1-3**, **11** and **13**, in step **2301**, the end-user selects the query's result "one-touch" feature (example of a feature that can be part of premium listing services **1902**). In step **2302**, IP phone **101** initiates a call via the corresponding infrastructure, e.g., wireless network **114**, voice network **103**, data network **102**. In step **2303**, settlement manager **13024** logs all actions associated with the served transaction.

It is noted that method **2300** may include other and/or additional steps that, for clarity, are not depicted. It is further noted that method **2300** may be executed in a different order than presented and that the order presented in the discussion of FIG. **23** is illustrative. It is further noted that certain steps in method **2300** may be executed in a substantially simultaneous manner.

FIG. **24** is a flowchart of a method **2400** for scheduling advertisements, as discussed above, in accordance with an embodiment of the present invention. Referring to FIG. **24**, in conjunction with FIGS. **1-3**, **11**, **13** and **19**, in step **2401**, merchants use front-end console **1101** to provide content for advertising services. For example, merchants may use TADS front-end console **1101** to subscribe to premium listing services **1902**. In step **2402**, merchants define distribution and level of exposure for advertisements. For example, merchants provide TADS with contextual information required for the platform to provide merchant priority placement in the presentation of query results to end-users. The contextual information takes the form of both keyword information associated with the merchant's services and end-user demographic information that the merchant may want included in the determination of whether or not top-billing should be provided to its listing. Further, merchants provide TADS with contextual information required for platform **300** to provide merchant priority placement in the presentation of query results to end-users as for premium listing services **1902** and provide additional multimedia material to be used in accordance to the type of multimedia material to be used in accordance to the type of multimedia listing selected by the merchant. For example, the merchant may opt for half-screen or quarter-screen images to be used in presenting its listing and for specific multimedia presentations to be presented to the end-user if the merchant's listing is selected by the end-user. In step **2403**, settlement manager **1302** logs all actions associated with the served transaction.

It is noted that method **2400** may include other and/or additional steps that, for clarity, are not depicted. It is further noted that method **2400** may be executed in a different order presented and that the order presented in the discussion of FIG. **24** is illustrative. It is further noted that certain steps in method **2400** may be executed in a substantially simultaneous manner.

FIG. **25** is a flowchart of a method **2500** to enable no contact call service functionality for its premium listings, as discussed above, in accordance with an embodiment of the present invention. Referring to FIG. **25**, in conjunction with FIGS. **1-3**, **11**, **13**, **19** and **20**, in step **2501**, merchants use front-end console **1101** to enable the no contact call service. In step **2502**, the end-user selects a query result with the no contact call service functionality. In step **2503**, TADS server **1001** manages the request by prompting the end-user to provide, via the converged communication terminal's input interface (interface to IP phone **101**), to provide all required information to complete a transaction according to the vendor's requirements. In step **2504**, the information is then transferred to the merchant without further end-user intervention, e.g., e-mail or synthesized voice message. In step **2505**, upon receipt of the request, the merchant takes the appropriate action. For example, a premium pizzeria's listing could prompt the user to select amongst a variety of offers. The user would provide the required information pertaining to the offers, e.g., pizza size, toppings, crust, and converged communications content distribution platform owner **2001** would relay the information to the merchant. There would be no need for the end-user to provide an address, a phone number and payment information since all of this information would already be available to converged communications content distribution platform owner **2001** through its relationship with the converged communications infrastructure service provider customer database that is part of the service provider's communication infrastructure **2007**. In step **2506**, settlement manager **1302** logs all actions associated with the served transaction. In step **2507**, merchant performs the service.

It is noted that method **2500** may include other and/or additional steps that, for clarity, are not depicted. It is further noted that method **2500** may be executed in a different order than presented and that the order presented in the discussion of FIG. **25** is illustrative. It is further noted that certain steps in method **2500** may be executed in a substantially simultaneous manner.

FIG. **26** is an embodiment of the present invention, illustrative of a domain-specific application for the enterprise environment, of the interaction between IP phone **101** and a voting application server **2601** used in implementing a voting booth application. Referring to FIG. **26**, in conjunction with FIGS. **1-3**, a voting booth application makes it possible to hold voting sessions on an arbitrary number of issues with an arbitrary number of voters. A client application hosted by platform **300** consults with a central server to get the information to be voted on and presents it to the user via a voting client user interface **2610**. The user can choose yes, no, or abstain on each issue included in the voting session. When the user has finished making selections, the votes are sent to server **2601**, which in turn saves all of them into a database **2606**. Several reports can be made with the data using the normal DBMS methods.

FIG. **26** illustrates client and server parts of the application and the data path between its cooperating modules. Client and server entities **101**, **2601**, respectively, communicate with each other using their voting communication protocol mod-

ules **2602**, **2603**, respectively. Voting session coordinator module **2604** controls voting sessions with all clients through their voting control logic module **2605** and aggregates vote information into database **2606** using a database exporter module **2607**. A web server **2608** then builds reports from the database on demand. A voting session viewing module **2609** lets an administrator supervise the voting process.

Although the method, computer program product and system are described in connection with several embodiments, it is not intended to be limited to the specific forms set forth herein, but on the contrary, it is intended to cover such alternatives, modifications and equivalents, as can be reasonably included within the spirit and scope of the invention as defined by the appended claims.

What is claimed is:

1. A system, comprising:

an Internet Protocol (IP) phone coupled to a server,

wherein said IP phone is configured to receive contextual information from said server, wherein said IP phone comprises:

a memory unit operable for storing a computer program for performing contextual searches;

a processor coupled to said memory unit, wherein said processor, responsive to said computer program, comprises:

circuitry for receiving a command to perform a contextual search;

circuitry for receiving search criteria;

circuitry for submitting said search criteria to said server; and

circuitry for receiving from said server a list of merchants matching said search criteria and information regarding each of said merchants in said list;

wherein a user of said IP phone completes a transaction with at least one of said merchants listed without the need to generate a voice call;

wherein said information received by said user of said IP phone comprises a variety of offers, wherein said user selects one of said variety of offers associated with said one of said merchants listed, wherein said selected offer is transmitted to said one of said merchants listed electronically; and

wherein said user's contact and payment information is not transmitted to said one of said merchants listed, wherein said user's contact and payment information is available to said one of said merchants listed.

2. The system as recited in claim **1**, wherein said server is configured to log actions of a user associated with viewing said list of merchants and contacting said merchants in said list.

3. The system as recited in claim **1**, wherein said search criteria comprises a location and a type of service establishment.

4. The system as recited in claim **1**, wherein said information regarding each of said merchants in said list comprises a name and contact information.

5. The system as recited in claim **4**, wherein said processor further comprises:

circuitry for storing said information on one of said merchants in said list selected by a user of said IP phone in a directory in said IP phone.

6. The system as recited in claim **4**, wherein said contact information comprises a telephone number, wherein said processor further comprises:

circuitry for receiving a selection of said telephone number associated with one of said merchants in said list selected by a user of said IP phone; and

circuitry for initiating a telephone call to said selected merchant via one of a wireless network, a voice network, a public switched telephone network and a data network.

7. The system as recited in claim **1**, wherein said merchants in said list of merchants select one of a plurality of advertising services, wherein each of said plurality of advertising services provides a different level of advertising exposure.

8. The system as recited in claim **7**, wherein said different levels of advertising exposure comprise a different amount of contextual information presented to a user of said IP phone.

9. A method for performing contextual searches on an Internet Phone (IP) phone comprising the steps of:

receiving a command to perform a contextual search;

receiving search criteria from a user of said IP phone;

submitting said search criteria to a server coupled to said IP phone; and

receiving from said server a list of merchants matching said search criteria and information regarding each of said merchants in said list;

wherein said information received by said user comprises a variety of offers, wherein said user selects one of said variety of offers associated with said one of said merchants listed, wherein said selected offer is transmitted to said one of said merchants listed electronically; and

wherein said user's contact and payment information is not transmitted to said one of said merchants listed, wherein said user's contact and payment information is available to said one of said merchants listed.

10. The method as recited in claim **9** further comprising the step of:

logging actions of said user associated with viewing said list of merchants and contacting said merchants in said list.

11. The method as recited in claim **9**, wherein said search criteria comprises a location and a type of service establishment.

12. The method as recited in claim **9**, wherein said information regarding each of said merchants in said list comprises a name and contact information.

13. The method as recited in claim **12** further comprising the step of:

storing said information on one of said merchants in said list selected by said user in a directory in said IP phone.

14. The method as recited in claim **12**, wherein said contact information comprises a telephone number, wherein the method further comprises the steps of:

receiving a selection of said telephone number associated with one of said merchants in said list selected by said user; and

initiating a telephone call to said selected merchant via one of a wireless network, a voice network, a public switched telephone network and a data network.

15. The method as recited in claim **9**, wherein said merchants in said list of merchants select one of a plurality of advertising services, wherein each of said plurality of advertising services provides a different level of advertising exposure.

16. The method as recited in claim **15**, wherein said different levels of advertising exposure comprise a different amount of contextual information presented to said user.

17. A tangible computer readable medium encoded with computer program for performing contextual searches on an Internet Phone (IP) phone comprising the steps of:

receiving a command to perform a contextual search;

receiving search criteria from a user of said IP phone;

submitting said search criteria to a server coupled to said IP phone; and

receiving from said server a list of merchants matching said search criteria and information regarding each of said merchants in said list;

wherein said user completes a transaction with at least one of said merchants listed without the need to generate a voice call;

wherein said information received by said user comprises a variety of offers, wherein said user selects one of said variety of offers associated with said one of said merchants listed, wherein said selected offer is transmitted to said one of said merchants listed electronically; and

wherein said user's contact and payment information is not transmitted to said one of said merchants listed, wherein said user's contact and payment information is available to said one of said merchants listed.

18. A tangible computer readable medium encoded with computer program as recited in claim **17**, wherein said server is configured to log actions of a user associated with viewing said list of merchants and contacting said merchants in said list.

19. A tangible computer readable medium encoded with computer program as recited in claim **17**, wherein said search criteria comprises a location and a type of service establishment.

20. A tangible computer readable medium encoded with computer program as recited in claim **17**, wherein said information regarding each of said merchants in said list comprises a name and contact information. as recited in claim **17**, wherein said information regarding each of said merchants in said list comprises a name and contact information.

21. A tangible computer readable medium encoded with computer program as recited in claim **20** further comprising the programming step of:

storing said information on one of said merchants in said list selected by said user in a directory in said IP phone.

22. A tangible computer readable medium encoded with program as recited in claim **20**, wherein said contact information comprises a telephone number, wherein the computer program further comprises the programming steps of:

receiving a selection of said telephone number associated with one of said merchants in said list selected by said user; and

initiating a telephone call to said selected merchant via one of a wireless network, a voice network, a public switched telephone network and a data network.

23. A tangible computer readable medium encoded with computer program as recited in claim **17**, wherein said merchants in said list of merchants select one of a plurality of advertising services, wherein each of said plurality of advertising services provides a different level of advertising exposure.

24. A tangible computer readable medium encoded with computer program as recited in claim **23**, wherein said different level of advertising exposure comprises a different amount of contextual information presented to said user.

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